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AUTHOR Yunker, John
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ABSTRACT

A study examined postsecondary vocational education at Minnesota's area vocational-technical institutes (AVTIs). During the study, researchers evaluated the efficiency and effectiveness of approximately 800 vocational programs offered by the AVTIs with respect to student and teacher ratios, program duplication, completion rates, placement rates, and wages. In reviewing student and teacher ratios, the researchers concluded that the existing ratio remains approximately 8 percent below what the AVTI system should be expected to achieve. The researchers found a significant amount of program duplication or overlap in public postsecondary vocational education, with 60 percent of the AVTI programs and 49 percent of community college programs operating within 65 miles of at least one similar program. Although most AVTI programs appeared to have a satisfactory completion rate, nearly one-fifth of them had a dropout rate of 50 percent or more during a recent 2-year period. Similarly, while most AVTI programs have been quite successful in placing students in related jobs, up to one-fourth of the programs had problems with related placement rates that merit close attention. Examination of the available data dealing with the earnings of individuals with high school versus postsecondary vocational training raises questions about the common conception that graduates of postsecondary vocational programs earn more than their counterparts from high school programs. Overall, it was estimated that between 40 and 50 percent of the AVTI programs examined have had at least one problem in the areas discussed above. (MN)

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POST-SECONDARY VOCATIONAL EDUCATION AT MINNESOTA'S AREA VOCATIONAL-TECHNICAL INSTITUTES

February 9, 1983

OFFICE OF THE LEGISLATIVE AUDITOR

PROGRAM EVALUATION DIVISION

STATE OF MINNESOTA

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PREFACE

Over the last ten years, post-secondary enrollment at Minnesota's area vocational-technical institutes (AVTIs) has more than doubled. State aids for post-secondary vocational education at the AVTIs have grown even faster, more than tripling during that time. Unlike Minnesota's other three post-secondary educational systems, the AVTIs are operated locally by school districts. Yet, the state aid received by AVTIs covers a greater share of their costs than the aids received by the other systems. In light of the dramatic growth in enrollment and costs, legislators wanted to take an objective look at the AVTI system. As a result, the Legislative Audit Commission directed the Program Evaluation Division to conduct this study.

We believe this report will help policy makers better understand the strengths and weaknesses in the AVTI system. The report presents a detailed analysis of the problems that exist and recommends actions to address those problems. In the future, it is possible that AVTIs will be asked to accomplish more with fewer real resources. Declining state revenues, a need to retrain displaced workers, and an increasing need to provide skilled employees for Minnesota businesses may dictate such a future. This report provides valuable suggestions for improving the system's efficiency and effectiveness.

We would like to thank the staff and management of the State Department of Education, the State Board for Vocational Education, and the 33 AVTIs for their assistance and cooperation during this study. We also wish to acknowledge the cooperation of the Community College Board staff, the Higher Education Coordinating Board staff, Educational Management Services, and the Minnesota Research and Development Center for Vocational Education at the University of Minnesota. The latter two operate the Minnesota (Post-Secondary) Vocational Follow-Up System and the Minnesota Secondary School Follow-Up System respectively.

Data analysis for this report was conducted by Dan Jacobson, Jo Vos, Tom Walstrom, and John Yunker (project manager) of the Program Evaluation Division staff. This report was written by John Yunker.

Gerald W. Christenson
Legislative Auditor

James Nobles
Deputy Legislative Auditor
for Program Evaluation

PROGRAM EVALUATION DIVISION

The Program Evaluation Division is part of the Office of the Legislative Auditor. The division's general responsibility, as set forth in statute, is to determine the degree to which activities and programs entered into or funded by the state are accomplishing their goals and objectives and utilizing resources efficiently. A list of the division's studies appears at the end of this report.

Topics for study are approved by the Legislative Audit Commission (LAC), but the findings, conclusions, and recommendations in Program Evaluation Division reports are solely the responsibility of the Legislative Auditor and division staff and are not necessarily the position of the LAC or any of its members. Upon completion, reports are sent to the LAC for review and are distributed to other interested legislators and legislative staff.

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EXECUTIVE SUMMARY

Over the past decade, there has been a dramatic growth in the post-secondary enrollment at Minnesota's area vocational-technical institutes (AVTIs). AVTI enrollment has more than doubled while the combined enrollment at other state post-secondary educational institutions has grown by only 13 percent.

State appropriations for the AVTIs have grown even faster than enrollment. Between the 1972-73 and 1982-83 bienniums, appropriations for operations and maintenance more than tripled. They are now second only to the University of Minnesota among the state's four post-secondary systems. State expenditures for the AVTIs, including retirement contributions and debt service, will total at least $215 million during the current biennium.

Vocational education is an essential part of post-secondary education in Minnesota. It makes a significant contribution to Minnesota's economy by supplying employers with a skilled work force. More than other post-secondary systems, it serves that segment of the student population that is academically or economically disadvantaged. However, in light of the amount of state expenditures on AVTIs and the recent decline in the state's financial resources, it is appropriate to ask how well the AVTIs' vocational programs have performed.

This report examines in detail the efficiency and effectiveness of the approximately 800 vocational programs AVTIs offer. In particular, we evaluate whether the State Department of Education and the State Board for Vocational Education have adequately managed the AVTI system. Our research was designed to address the following issues:

- Student/Teacher Ratios: Is the student/teacher ratio in the AVTI system reasonably efficient? Have programs with unnecessarily low ratios been either improved or discontinued?

- Program Duplication: To what extent is there any unnecessary program duplication within the AVTI system or between the AVTI system and other state institutions offering post-secondary vocational education courses?

- Completion Rates: Are AVTI programs with low completion rates and high costs per completion either improved or eliminated?

- Placement Rates: Does the State Department of Education identify those programs that place a low percentage of their graduates in training related jobs? Are programs with low placement rates adequately evaluated? Is appropriate action taken to improve placement rates in these programs?

- Wages: Does AVTI training increase the earnings of AVTI graduates?

A. FINDINGS

1. STUDENT/TEACHER RATIOS

The largest single component of state aid to AVTIs is for instructional costs. The majority of this instructional aid pays the salaries and fringe benefits of the instructors who teach AVTI courses. As a result, the most important factor affecting the efficiency of the AVTI system is the efficiency with which its instructional staff is utilized.

Both the State Board for Vocational Education and the Legislature have recognized the need to have efficient programs. The Board has had a long standing policy that programs of all types be required to maintain a minimum of ten students per full-time instructor. In 1979, that policy was promulgated as a rule. In 1980, the Legislature directed the Board to differentiate among each of the seven broad occupational areas (agriculture, distributive education, health, home economics, business and office, technical, and trade and industrial) when specifying the minimum student/teacher ratios required. Legislative intent was to achieve a higher minimum ratio in those areas where a higher standard is reasonable.

However, in reviewing student/teacher ratios, we found that:

- Programs with low student/teacher ratios have been and continue to be a source of inefficiency in the AVTI system.
- The State Department of Education did not begin to recommend termination of programs with ratios less than ten until 1982.
- The existing rule is too lenient for most non-health programs, particularly those in the distributive education and office areas. The State Department of Education and the State Board have not complied with the requirement that different ratios be considered for different types of programs.
- Because of increasing enrollments and declining resources, the overall student/teacher ratio has improved in recent years. However, the ratio remains approximately 8 percent below what the AVTI system should be expected to achieve.

2. PROGRAM DUPLICATION

There is a significant amount of program duplication or overlap in public post-secondary vocational education. We found that 60 percent of AVTI programs and 49 percent of community college programs operate within 65 miles of at least one other similar program. On average, each of these overlapped programs operates within 65 miles of three similar programs.

Not all of this overlap is undesirable. If the programs are utilizing resources efficiently, then little may be gained by consolidating programs. However, we found that a significant number of these overlapped programs had low student/teacher ratios. In fiscal year 1981, approximately 25 percent of all AVTI programs and 10 percent of all community college vocational programs operated within 65 miles of another similar program and also had low student/teacher ratios. Ratios less than 15 for non-health programs and 10 for health programs were considered low.

It has generally been state policy to promote accessibility to vocational education by providing programs throughout the state. As a result, some compromise between the goals of efficiency and accessibility is necessary, particularly in the less densely populated areas of the state. We found, however, that the greatest problem was within the metropolitan area. Thirty-two percent of the programs offered by metropolitan AVTIs were also offered elsewhere within 65 miles and had low student/teacher ratios. Clearly, this means there may be significant opportunities for improving efficiency and reducing duplication without greatly affecting accessibility. Opportunities for reducing unnecessary duplication also exist outside the metropolitan area. Twenty-one percent of the programs offered by outstate AVTIs had low student/teacher ratios and were within 65 miles of at least one other similar program.

3. COMPLETION RATES

An important factor in any educational system's performance is the percentage of its students that complete their training. We found that while most AVTI programs have a satisfactory completion rate, a significant number do not. In particular, we found that:

- Nearly one-fifth of all AVTI programs had a dropout rate of 50 percent or more during a recent two-year period.
- Insufficient attention has been paid to this problem. There have been few attempts by the State Department of Education to identify programs with high dropout rates, evaluate the reasons for the problem, and to assist the AVTIs in taking corrective action.

The only available data that can be used to calculate dropout rates tend to underestimate the problem for individual programs. Students who transfer from one program to another at the same AVTI are not counted as dropouts. As a result, the data may understate the dropout rate for certain individual programs.

4. RELATED PLACEMENT RATES

The primary goal of the AVTI system is that its graduates be employed in jobs related to their training. In this way, the AVTIs are able to serve students by teaching them marketable skills and employers by providing them with skilled employees.

In the past, it has generally been reported that AVTIs have had considerable success in placing students in related jobs. Placement rates of 90 percent have been cited by the schools and vocational education advocates as being typical.

We found that the State Department of Education has maintained an excellent follow-up system for tracking the employment of graduates up to one year after graduation. The system is superior to those used by Minnesota's other post-secondary educational systems. Unfortunately, data on related employment have not been used for management or budgeting decisions. They also have not been used effectively when the federally mandated evaluations of AVTI programs are conducted. In fact, the State Board's rule on placement does not even mention that placements be related to training. The rule only requires that more than 50 percent of all graduates who have completed their educational objectives and are available for employment be employed in order for a program to continue to operate.

Data collected by the Minnesota Vocational Follow-Up System permit us to provide some estimate of how well AVTI programs have done. We found that most AVTI programs, particularly those in technical, health, and some trade and industrial occupations, have been successful. Although the percentage of graduates with related jobs is less than that reported by the schools and vocational advocates, it is reasonably high for most programs. However, we found that, even prior to the current economic recession:

- Up to one-fourth of all AVTI programs had problems with related placement rates that merit close attention.
- In at least 10 percent of all programs, the problems are severe.

The follow-up system defines related placement in two ways: (1) jobs that are closely related to a student's training and (2) jobs that are broadly but not closely related to a student's training. Using these definitions, we calculated the placement rates for all AVTI programs operating during fiscal years 1977, 1978, and 1979. We found that:

- In 28 percent of all programs, 50 percent or fewer of the graduates were employed in a job closely related to their training one year after graduation.
- If broadly related placements are included, 13 percent of all programs had related placement rates of 50 percent or less.

If graduates who say they are unavailable for employment are excluded, the percentage of low placement programs is 22 percent using the closely related placement measure and 10 percent with broadly related placements included.

Clearly, 10 percent of AVTI programs have serious problems. The reasons for the low related employment of AVTI graduates vary by program. They include but are not limited to: (1) an excess statewide supply of workers in a particular occupation, (2) an insufficient local demand for a particular occupation, (3) inadequate training or equipment, (4) programs being taken for personal use rather than for acquiring marketable employment skills, and (5) schools or the State Department of Education paying inadequate attention to placement. It is important that these programs be immediately reviewed to determine the nature of the problem.

Some of the other programs that have low closely related placement rates but rates higher than 50 percent when broadly related placements are included also have problems that merit close scrutiny. We found that a number of the programs with low closely related employment rates appear to be overly specialized. For example, some legal secretary and medical secretary programs place only a small percentage of their graduates in these specialized areas although the majority do get secretarial or clerical jobs. Since student/teacher ratios in the general secretary and clerical programs can be increased, fewer of the specialized programs should be offered. The students who would otherwise enroll in those programs could select one of the many general secretary or clerical courses offered throughout the state. Alternatively, schools could offer a core curriculum for general secretarial skills and offer students one or more short courses in these or other specialized areas. In either case, the AVTI system would be able to accomplish as much as before but with fewer resources.

The broadly related placement measure is also too generous for certain other programs, particularly those in the trade and industrial area. During the time period examined, too many diverse occupations were included in the trade and industrial area for the broadly related placement measure to be meaningful for trade and industrial graduates. Student opinion on job relatedness confirms that most of the trade and industrial jobs classified as broadly related are not related to the student's training.

The percentage of programs with related placement rates of 50 percent or less increased dramatically for fiscal year 1980 and 1981 graduates. Compared to 28 percent in the three prior years, the percentage of programs with 50 percent or fewer graduates in closely related jobs one year after graduation was 47 percent for fiscal year 1980 and 42 percent for fiscal year 1981. Although the current economic recession is largely responsible for the increase, the AVTIs and the State Department of Education should attempt to determine what occupations are likely to be permanently affected by changing economic conditions.

It should be recognized that vocational programs can provide some benefits to students even if they do not get jobs related to their training. For example, a student who acquires interview skills and good work habits but obtains an unrelated job has benefited from the training program. However, the Department and the AVTIs must be careful not to justify the continuation of a program with a low closely related placement rate for this reason alone. If the program is training individuals for an occupation in which the job opportunities are extremely limited, one should ask whether there are other vocational programs that could serve these students better. This is particularly important since many programs with good related placement rates are operating at lower than optimal student/teacher ratios and can accommodate more students.

5. WAGES

Educational research studies tend to indicate that individuals with post-secondary vocational education training earn more than high school graduates without a post-secondary education. A number of studies raise questions about whether this general conclusion applies equally to all post-secondary vocational programs. In Minnesota, the average AVTI graduate may earn more than those who do not have a post-secondary education. However, this may not be true for graduates of certain AVTI programs.

We found a number of types of AVTI programs whose graduates earn about the same wages as high school graduates with similar jobs. Unfortunately, the available data limit any comparison of the wages earned to one year after graduation. It is often suggested that one of the benefits of a post-secondary vocational education is an increase in earnings potential and promotions in the long run. The validity of that claim cannot be tested because the necessary data are not collected on AVTI graduates. Nevertheless, the existing data raise questions about the value of certain programs that should be addressed by the State Department of Education.

6. COMBINED IMPACT

Overall, between 40 and 50 percent of AVTI programs have had one or more of the following problems in recent years: 1) a closely related placement rate of 50 percent or less one year after graduation, 2) a dropout rate of 50 percent or more, or 3) a student/teacher ratio under ten. Others may have operated inefficiently by having a student/teacher ratio that was low although it did not fall below ten.

The impact of these problems is that, in a significant number of programs, the cost per person employed in a job closely related to his/her training is extremely high. In fiscal years 1980 and 1981, the total cost (including administrative and other overhead costs) per completion in a closely related job exceeded $20,000 for 26 percent of the programs that are between 15 and 24 months in length. Twenty-four percent of the programs lasting 6 to 14 months cost $15,000 or more per person employed in a closely related job one year after graduation. If placement rates from the three prior years are used instead, the percentage of longer programs costing more than $20,000 per closely related placement is 14 percent. Twelve percent of the shorter programs exceed $15,000 per closely related placement. Because of the current recession, placement rates for fiscal year 1977, 1978, and 1979 graduates may be more indicative of future rates than the rates for fiscal year 1980 and 1981 graduates.

Using the 1977-79 placement data, we estimate that, for at least 20 percent of all programs, fewer than three students per full-time instructor were employed in a closely related job one year after leaving an AVTI. Approximately 9 percent of the programs had fewer than four completions per full-time instructor and 19 percent had fewer than five completions per instructor.

B. RECOMMENDATIONS

These findings indicate that there has been a serious lack of program accountability within the AVTI system. Inefficient and ineffective programs have been permitted to continue without appropriate management actions being taken. We recommend that the State Department of Education, the State Board for Vocational Education, and the AVTIs re-examine the programs currently being offered in light of these findings and take strong actions to improve the system. We recommend the following actions:

- The State Board for Vocational Education should set higher minimum student/teacher ratios for non-health programs.

- The State Department of Education should identify those programs with student/teacher ratios below these standards and recommend appropriate action to the State Board.

- The Department and the Board should take the necessary steps to achieve a systemwide student/teacher ratio of at least 17 in non-health programs and 12 in health programs, including related instructors.

- Attention should also be paid to whether similar programs are offered by other nearby AVTIs or community colleges. Unnecessary program duplication should be eliminated. The Higher Education Coordinating Board and its staff should ensure that a coordinated approach to this problem is taken by the post-secondary systems involved.

- The State Board for Vocational Education should establish a clear and meaningful policy regarding the related placement rates AVTI programs are expected to achieve. The State Department of Education should develop a reasonable definition of related placement.

- The Department, in cooperation with the AVTIs, should examine those programs with low placement or high dropout rates and determine the reasons for poor performance. Existing data on employer satisfaction with graduates and student satisfaction with programs may help to clarify the reasons. Where appropriate, the Department should recommend modification or termination of programs to the State Board.

- The Department should supplement its review of programs by examining certain composite measures of program efficiency and effectiveness. For example, the cost per completion or completions per full-time instructor could be used to identify those programs that are inefficient. Cost per related placement or related placements per full-time instructor are useful composite measures of a program's efficiency and effectiveness.

- The Department should also examine those programs whose graduates earn wages similar to high school graduates. A limited 3 year follow-up of these AVTI graduates should be conducted to determine if graduates of these programs fare any better than high school graduates without the training.

It should be emphasized that those regular instructional programs with a high percentage of handicapped or other disadvantaged students classified as special needs students should not be expected to meet the same standards as other programs. Interestingly, the available data indicate that the performance of programs with a greater than average percentage of special needs students is not significantly different from those with few special needs students. According to Division of Vocational-Technical Education managers, there are AVTI students not classified as special needs students who need remedial instruction in reading, writing and mathematics, but do not receive it from existing special needs programs. It is difficult to verify the extent to which this occurs; however, it is clear that the AVTI system does serve a student clientele different from that of other post-secondary systems in Minnesota. The AVTI student population has lower combined verbal and math aptitude test scores than the students enrolled at schools in the other three systems. The AVTIs also serve more students of a low socioeconomic status.

If the Department is correct, there may be reason to extend remedial instruction programs to cover more students than currently are being served. The increased coverage might help to reduce dropout rates or improve placement rates. In evaluating programs, however, one should be careful not to attribute every dropout or placement problem to the nature of the student clientele. The data presented in this report indicate that the poor performance of many vocational programs is due to other factors.

The Vocational-Technical Education Division of the State Department of Education and State Board for Vocational Education must assume most of the responsibility for the lack of program accountability in the AVTI system. We recognize that the AVTIs also share in that responsibility. However, we believe that adequate direction and assistance from top management are requirements for success in any organization.

It should be noted that the State Department of Education and State Board, with new division management, has begun to emphasize the need for program accountability within the last two years. The Division has begun to enforce the existing rule requiring programs to maintain a student/teacher ratio of ten. Because of budget cuts, seven of the programs not meeting the requirement in fiscal year 1982 were voluntarily eliminated by AVTIs effective in fiscal year 1983. The Division is recommending to the Board that six others also be terminated. In addition, the Division has developed a framework for reviewing AVTI programs and making management decisions at the state and local levels. This system was developed in response to legislative requests to all four post-secondary systems for plans addressing the problems of declining enrollments and resources.

While the Division of Vocational-Technical Education, the State Board, and the AVTIs are headed in the right direction, it is clear that much more work is needed. The comprehensive review of programs that we recommend will require the Division to place a great deal more emphasis on related placement rates and completion rates than has been done in the past. The data we have developed on closely related placements per instructor and completions per instructor for the approximately 800 AVTI programs should be helpful.

The involvement of the Legislature and the Governor's Office is also needed to ensure that greater program accountability is achieved. We recommend that the appropriate legislative committees require the State Department of Education to report back periodically over the next year on progress made. In addition, we suggest that the Legislature and the Governor budget funds for the AVTI system consistent with the goal of achieving an average student/teacher ratio of at least 17 in non-health programs and 12 in health programs. Appropriation levels will determine how far the AVTI system will go toward achieving these and other objectives outlined in this report. It is equally important, however, that resources for vocational education be carefully allocated. Education is vital to maintaining and attracting jobs. The AVTIs must be able to respond to the needs of employers for skilled workers and be able to adjust to changing economic conditions.

The Legislature and the State Board may also wish to review the instructional aid funding formula. The formula tends to work well as long as programs are operated efficiently and effectively. Since the formula allocates funds based on previous staffing levels, it can result in some inequities when this is not the case. For example, programs operating at unnecessarily low student/teacher ratios receive funding based on those inefficient staffing levels. If the AVTI improves the program's efficiency or the State Board terminates the program, the AVTI would continue to receive funding for the program based on the inefficient staffing levels for two years unless the AVTI's total enrollment is significantly affected.

There are ways for the State Board to partially offset these inequities when the Board allocates equipment, supply, and support services aids to the AVTIs. They can, however, result in an unnecessarily complex way of budgeting for programs and support services. It may take more experience with the formula to determine whether inequities can be adequately controlled.

A number of more substantial structural changes in vocational education have been suggested by others. During the 1981 legislative session, the Higher Education Coordinating Board (HECB) recommended that the AVTI and community college systems be merged. The HECB proposal would have removed the operational control of AVTIs from local school districts. Alternatively, the AVTI system could be made a state system like Minnesota's other post-secondary systems. Such a change would also remove local control but not involve a merger.

Such proposals have not been the focus of this report. However, the results of this report are relevant to a discussion of alternative structures. The question of whether the existing organizational structure can and will respond to the need for greater program accountability is one of the important issues in such a discussion. The response of the AVTIs and the State Department of Education to this problem should be reviewed if a major structural change is considered.

INTRODUCTION

This report is divided into eight chapters. Chapter I provides a brief overview of the area vocational-technical institutes (AVTIs). The roles of the State Department of Education and the State Board for Vocational Education are also discussed. Chapter II examines student/teacher ratios in AVTI programs. The efficiency with which staff are utilized is questioned. Chapter III evaluates whether there is unnecessary duplication among post-secondary vocational programs. Programs within the AVTI and community college systems are included in our analysis. Chapter IV examines completion and dropout rates in AVTI programs. Chapter V evaluates whether AVTIs have been successful in placing their graduates in training related jobs. Chapter VI compares the wages of AVTI graduates to those earned by high school graduates in similar jobs. Chapter VII presents several composite measures that can be used to assess the performance of vocational programs. Chapter VIII presents our recommendations for improving the efficiency and performance of AVTI programs.

I. OVERVIEW

Minnesota has one of the most extensive public systems of post-secondary vocational education in the country. Vocational programs are offered by area vocational-technical institutes (AVTIs), community colleges, state universities, and the University of Minnesota. Also, in contrast to most other states, a relatively high percentage of the costs of post-secondary vocational education is paid from state government funds. We estimate that about 70 percent of the costs are state funded. The percentage has been somewhat higher in the AVTI system and slightly lower in the community college and other systems.

The remainder of this chapter provides a brief overview of the AVTI system. It is appropriate to focus on the AVTI system since the vast majority of state funds supporting post-secondary vocational education go to the AVTIs. In addition, approximately 80 percent of the vocational programs offered and students enrolled are in the AVTIs.

A. ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

In 1945, legislation passed allowing local school districts to establish area vocational-technical schools and providing for their support through a system of state aids. In all, 33 AVTIs have been established in Minnesota . Figure 1 shows the location of Minnesota's AVTIs.

The AVTIs offer training in seven broad occupational areas: (1) agriculture, (2) distributive education, (3) health, (4) home economics, (5) office, (6) technical, and (7) trade and industrial occupations. These seven broad occupational areas include over 170 different occupations. If occupational programs offered by more than one school are included, the AVTIs offer approximately 800 programs.

The structure of the AVTI system differs from that of other post-secondary educational systems in Minnesota. Minnesota's AVTIs are operated by local school districts. The local districts hire staff, purchase equipment, and otherwise generally manage the operation of vocational programs.

State oversight of these locally managed schools is accomplished through the State Board for Vocational Education and the State Department of Education.[1] The Board sets curriculum and staffing standards, approves programs and courses of study, sets

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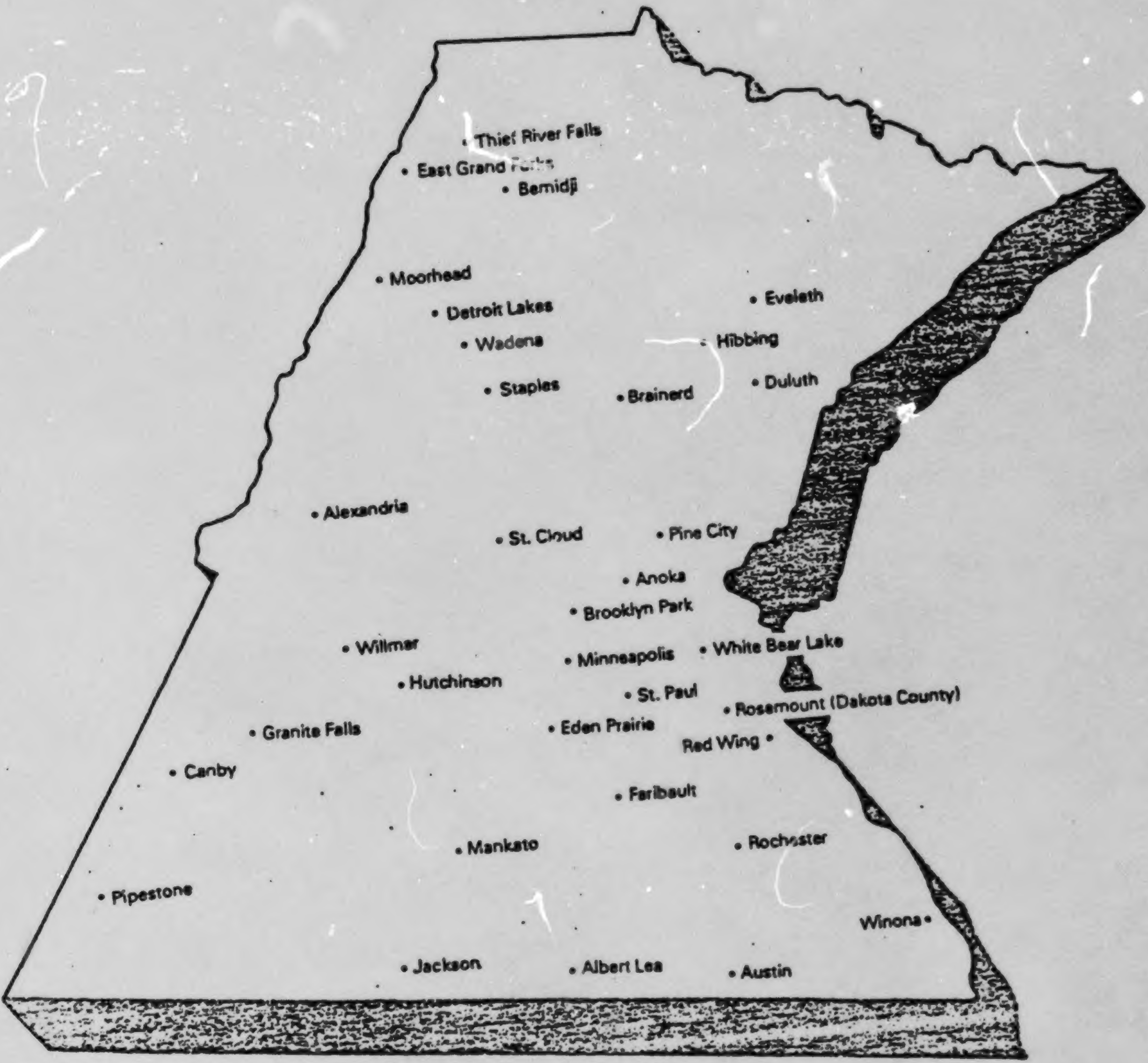
[1] The State Board for Vocational Education is composed of the same members as the State Board of Education, which is responsible for oversight of Minnesota's elementary and secondary educational system.

FIGURE 1

LOCATION OF MINNESOTA'S AVTIs*



*Suburban Hennepin AVTI has two locations, Brooklyn Park and Eden Prairie.

tuition rates, and allocates federal funds and certain state funds among the 33 AVTIs. The Department, through its Division of Vocational-Technical Education, provides staff support to the part-time board. Department staff provide management supervision of the annual budget process, review and evaluate existing vocational programs, recommend new programs that respond to the emerging needs of business and industry, and provide certain management and other services for the AVTIs.

B. FUNDING FOR THE AVTIs

Financing post-secondary vocational education at the AVTIs is a significant cost for state government. We estimate that approximately $215 million in state funds will be spent on the AVTIs during the 1982-83 biennium. This is an amount more than triple the state funds spent in the 1972-73 biennium.

In fact, the bulk of AVTI revenues are provided from state general fund revenues. We estimate that in fiscal year 1981 at least 72 percent of the AVTI's funding came from the state. This percentage was the highest of all of Minnesota's post-secondary educational systems. Other sources of revenue included tuition (10 percent), federal government aids (8 percent), and sales of fixed assets and student produced products and services (7 percent). About 3 percent was provided from interest earnings on AVTI fund balances and revenue recaptured from those balances. Table 1 shows these sources of revenue. Since fiscal year 1981, the percentage of revenue supplied by state aids has declined slightly while that provided by tuition has increased.

The state also pays for the employer's share of Social Security and Teacher Retirement Association contributions for licensed instructional staff in the AVTIs. The state's overall share of AVTI costs in fiscal year 1981 rises to about 73 percent if these contributions are included. The state's share would be even higher if earnings from AVTI fund balances were excluded. The latter revenues could be excluded since local fund balances now originate exclusively from the receipt of state, federal, tuition, or sales revenues.

In 1979, the Legislature changed the method of allocating state aids to post-secondary vocational education, effective in fiscal year 1981. Prior to fiscal year 1981, local school districts levied a property tax. In fiscal year 1981, this levy was replaced with state funds.[2] The aids system was also restructured by creating five new

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[2] In fiscal year 1980, the last year of the levy, the property tax levy raised $4.4 million. Although school districts no longer levy to raise operating revenues, they may raise a portion of the costs of major capital improvements through a property tax levy. Since 1979, school districts are required to pay for 15 percent of the costs of any major building construction or remodeling project. The state issues bonds to cover the other 85 percent of the costs.

TABLE 1

AVTI REVENUES
FISCAL YEAR 1981

			Percent of Total
State Aid:			
Instructional	$48,962,673		
Support Service	19,770,055		
Supply	10,599,400		
Capital	8,490,314		
Debt Service	7,737,600		
New Program	130,000		
Other	702,410		
Total State		$ 96,392,452	71.6%
Federal Aid:			
Support Service	$ 6,891,517		
Special Need	2,047,357		
Capital	500,000		
Other	1,814,437		
		11,253,311	8.4
Other Revenues:			
Tuition		12,769,756	9.5
Sales		10,119,147	7.5
Local (Interest earnings and revenue recapture)		4,119,066	3.1
TOTAL REVENUES		$134,653,732	100.1%

Source: State Department of Education.

categories of aid: instructional aid, supply aid, support services aid, capital expenditure aid (later replaced with a combination of equipment aid and repair and betterment aid by the 1981 Legislature), and debt service aid.

Instructional aid, which provides the majority of the state aid to the AVTIs, is allocated by a formula prescribed by statute. Instructional aid provides state funding for instructional salaries and certain fringe benefits, staff travel, purchased instructional services, and other instructional expenses. The formula provides each AVTI with an instructional allowance for each of its programs and then weights the sum of each AVTI's program allowances by three factors. The allowance for each program is equal to the statewide average cost per full-time instructor in the base year (second prior year) for programs of the same type times the number of full-time instructors the AVTI had in that program in the base year. The weights adjust the sum of the program allowances to reflect: (1) variations in the average staff compensation among AVTIs, (2) the inflationary increase in salaries and other instructional costs between the base year and the current year, and (3) changes in each school's overall enrollment between the base year and the current year. No adjustment for enrollment is made unless the change is greater than five percent. Furthermore, only that portion of the change that is in excess of five percent is reflected in the adjustment.

The allocation of most of the other aids (supply, support services, equipment, and repair and betterment aids) is determined by the State Board for Vocational Education with the assistance of the State Department of Education. The Board must decide how much of the total amount appropriated for each of these aids will go to each AVTI. The Board's decisions are reached after budget hearings held in the spring of each year.

C. ENROLLMENT

The enrollment in Minnesota's AVTIs has increased dramatically over the last decade. Between fiscal years 1972 and 1982, average daily membership (ADM) more than doubled, growing from 16,256 students to 34,977 students. As Table 2 and Figure 2 show, this increase was more pronounced in the metropolitan area. With the establishment of three new metropolitan schools in 1971, metropolitan enrollment more than tripled over the next ten years. Outstate enrollment grew by 73 percent between 1972 and 1982.

Enrollment growth has, however, leveled off in recent years. Most of the last decade's increase in AVTI enrollment came during the early 1970s. Between 1972 and 1977, enrollment grew by 88 percent. Between 1977 and 1982, enrollment grew by less than 15 percent. Most of the increase in the last five years came in fiscal year 1981 when enrollment increased by 8.4 percent. That increase may be due to the temporary decline in economic conditions in Minnesota and the nation. Table 3 shows recent trends in AVTI enrollment and projected enrollment for fiscal year 1983.

TABLE 2

AVERAGE DAILY MEMBERSHIP
FISCAL YEARS 1972-1982

AVTI	1972	% of Total	1982	% of Total	% Change 1972-1982
Metropolitan Area:					
Anoka	1,414	8.7%	1,943	5.6%	37.4%
Dakota County	147	.9	1,907	5.5	1,197.3
Minneapolis	938	5.8	2,155	6.2	129.7
916	98	.6	2,357	6.7	2,305.1
St. Paul	1,758	10.8	2,573	7.4	46.4
Suburban Hennepin	78	.5	3,574	10.2	4,482.1
Area Subtotal*	4,433	27.3%	14,509	41.5%	227.3%
Outstate:					
Albert Lea	245	1.5%	593	1.7%	142.0%
Alexandria	1,018	6.3	1,667	4.8	63.8
Austin	335	2.1	721	2.1	115.2
Bemidji	144	.9	442	1.3	206.9
Brainerd	462	2.8	739	2.1	60.0
Canby	340	2.1	474	1.4	39.4
Detroit Lakes	411	2.5	727	2.1	76.9
Duluth	1,006	6.2	1,314	3.8	30.6
East Grand Forks	--	--	496	1.4	--
Eveleth	238	1.5	319	.9	34.0
Faribault	270	1.7	437	1.2	61.9
Granite Falls	200	1.2	445	1.3	122.5
Hibbing	239	1.5	537	1.5	124.7
Hutchinson	203	1.3	668	1.9	229.1
Jackson	400	2.5	570	1.6	42.5
Mankato	836	5.1	1,402	4.0	67.7
Moorhead	718	4.4	975	2.8	35.8
Pine City	146	.9	287	.8	96.6
Pipestone	372	2.3	514	1.5	38.2
Red Wing	31	.2	678	1.9	2,087.1
Rochester	495	3.0	1,001	2.9	102.2
St. Cloud	1,137	7.0	1,573	4.5	38.3
Staples	420	2.6	622	1.8	48.1
Thief River Falls	410	2.5	549	1.6	33.9
Wadena	329	2.0	548	1.7	77.5
Willmar	872	5.4	1,503	4.3	72.4
Winona	549	3.4	632	1.8	15.1
Outstate Subtotal*	11,826	72.7%	20,468	58.5%	73.1%
STATE TOTAL*	16,256	100.0%	34,977	100.0%	115.2%

Source: State Department of Education.

*Differences between the sum of AVTI's and the state subtotals and total are due to rounding.

FIGURE 2

AVERAGE DAILY MEMBERSHIP
Fiscal Years 1972 - 1982

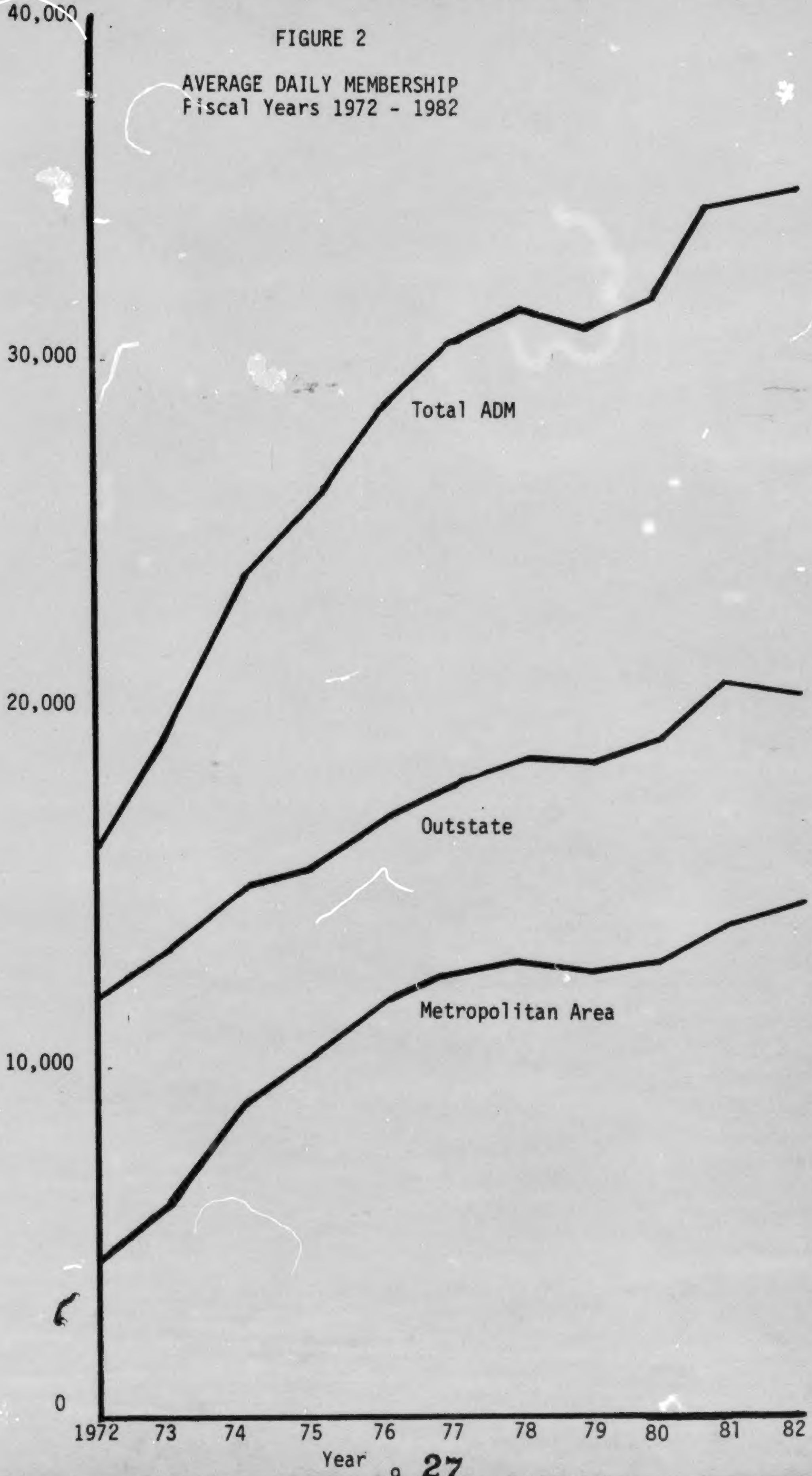

TABLE 3

AVERAGE DAILY MEMBERSHIP

FISCAL YEARS 1977-1983

	ADM						
	1977	1978	1979	1980	1981	1982	Estimated 1983
Metropolitan Area	12,553	12,835	12,579	12,734	13,720	14.509	15,141
Outstate	17,980	18,566	18,424	18,979	20,643	20,468	20,619
STATE TOTAL	30,533	31,401	31,003	31,713	34,363	34,977	35,760

	Percentage Change in ADM					
	1977-78	1978-79	1979-80	1980-81	1981-82	Estimated 1982-83
Metropolitan Area	2.2%	(2.0)%	1.2%	7.7%	5.8%	4.4%
Outstate	3.3	(0.8)	3.0	8.8	(0.8)	0.7
STATE AVERAGE	2.8%	(1.3)%	2.3%	8.4%	1.8%	2.2%

Source: State Department of Education.

Over the next ten to fifteen years, it is expected that the AVTIs and other post-secondary systems will face substantial enrollment declines. The Higher Education Coordinating Board has projected a decline of about 25 percent between 1979 and the mid-1990's. Such enrollment decreases will require policymakers to make important decisions affecting the future of the AVTIs and other systems.

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II. STUDENT/TEACHER RATIOS

The largest single component of state aid to AVTIs is for instructional costs. In fiscal year 1981, state instructional aid accounted for approximately 55 percent of state aid for AVTI operations and maintenance. The majority of this instructional aid pays the salaries and fringe benefits of the licensed instructors who teach post-secondary vocational courses at the AVTIs. As a result, the most important factor affecting the efficiency of the AVTI system is the efficiency with which its instructional staff is utilized.

This chapter evaluates the efficiency of AVTI programs as measured by the ratio of students taught per instructor. The first section reviews the history and enforcement of the State Board for Vocational Education's existing rule requiring programs to maintain a student/teacher ratio of at least ten. The second section examines whether the Board's current rule is adequate.

A. ENFORCEMENT OF THE EXISTING STANDARD

The State Department of Education (SDE) has had a long standing policy that individual AVTI programs must operate with a minimum of ten students per instructor. Prior to 1979, this policy was set forth in the State Plan for Vocational Education. In 1979, the policy was promulgated as a rule that states:

> Instructional programs shall have an enrollment of ten or more average daily memberships (ADM) per each full-time equivalency (FTE) staff. When more than one program section is in operation an average may be used. Exemptions shall be given where licensure requirements are specifically established or on recommendation of other state industry groups. Exemption may be granted by the commissioner of education when adequately justified. Programs not meeting the minimum student requirement shall be placed on one-year probation during which enrollment must meet the ten student criteria in order to receive subsequent approval.[1]

However, we found that the State Department of Education did not initially enforce this rule. In 1980, the Department made a partial attempt to enforce the rule by sending out probation letters to schools that had programs below the required 10:1 ratio in fiscal year 1979. But, the Department and the State Board failed to terminate those programs that remained under the 10:1 ratio for a second consecutive year in fiscal year 1980. Furthermore, the Department failed to put any of the programs with inadequate enrollment for fiscal year 1980 on probation.

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[1] See 5 MCAR §1.0101F. An ADM is equivalent to one student attending full-time for one school year; that is, a student attending six hours per day for 175 days, or 1050 hours. An instructor teaching six hours per day for 175 days, or 1050 hours, is considered a full-time instructor.

Maintaining these low enrollment programs was costly to the state. In the four years between fiscal years 1978 and 1981, between 10 and 20 percent of AVTI programs had a student/teacher ratio less than the required 10:1 ratio (see Table 4). Between $5 and $10 million in direct costs have been spent on these programs annually. If social security and retirement contributions as well as indirect administrative and other indirect costs are added, the total cost would be higher. Table 5 shows the direct program costs of low enrollment programs in fiscal years 1980 and 1981.

TABLE 4

PROGRAMS WITH STUDENT/TEACHER RATIOS UNDER 10:1 FISCAL YEARS 1978-1981

Occupational Area	Number of Programs* and Percent of Programs							
	1978		1979		1980		1981	
Agriculture	9	20.5%	12	25.5%	13	27.1%	13	26.0%
Distributive Education	6	9.8	13	20.3	15	23.4	8	12.9
Health	39	52.7	30	40.0	33	41.8	22	27.5
Home Economics	4	19.0	10	47.6	5	23.8	4	19.0
Business/Office	18	11.8	24	15.2	17	11.0	10	6.3
Technical	4	6.0	6	8.7	4	5.6	3	4.2
Trade/Industrial	27	8.0	58	17.0	47	13.9	21	6.2
OVERALL	107	14.2%	153	19.7%	134	17.2%	81	10.4%

Source: Program Evaluation Division analysis of SDE data.

*The definition of an AVTI program used in this analysis is any course offered at an AVTI that is included individually for funding purposes in the SDE program budget system. The programs included in the program budget system are categorized according to a classification system established by the U.S. Office of Education (OE), now the U.S. Department of Education. The classification system groups programs according to a six digit OE code. For example, all auto mechanics programs have an OE code of 17.0302.

TABLE 5

DIRECT PROGRAM COSTS FOR LOW ENROLLMENT PROGRAMS: FISCAL YEARS 1980 and 1981

Occupational Area	1980 Direct Costs*	1980 % of Direct Costs	1981 Direct Costs	1981 % of Direct Costs
Agriculture	$ 737,336	20.9%	$1,246,214	30.7%
Distributive Education	694,809	18.6	547,546	13.7
Health	2,746,691	48.1	2,078,127	34.4
Home Economics	109,710	9.6	158,994	14.4
Business/Office	904,347	8.9	552,281	4.9
Technical	214,214	3.9	173,249	2.8
Trade/Industrial	2,915,187	9.6	930,386	2.9
OVERALL	$8,322,294	13.9%	$5,686,797	8.8%

Source: Program Evaluation Division analysis of SDE data.

*Direct costs include all costs that are directly assigned to an instructional program minus sales and certain other revenue the program generates. Social security and retirement contributions were not included.

A significant number of programs failed to meet the 10:1 standard in two or more consecutive years. We found that 48 programs, or about six percent of all programs, were below the standard in both fiscal years 1980 and 1981. Thirty-five of these programs were also below the 10:1 standard in fiscal year 1979. Twenty-five programs were below the standard in each of the four years from fiscal year 1978 to 1981.

In addition, programs that are below the standard one year rise above the 10:1 ratio the next year. However, in the years when these programs had enrollment above the standard, their student/teacher ratio tended to be close to 10:1. A total of 121 programs, or more than 15 percent of all AVTI programs, failed to meet the 10:1 standard in at least two of the four years between fiscal years 1978 and 1981.

The fiscal impact of maintaining programs with low enrollment can be seen by comparing their average cost to that for other programs. Table 6 shows that in fiscal year 1981 programs with low enrollment cost 61 percent more than other programs per full-time student. The percentage difference in average cost varies by occupational area but is substantial in every area. Table 7 shows the percentage difference in average cost for particular types of programs. In any major program area having at least one low enrollment program, the average cost of programs in that area is always less than that for the program with the lowest student/teacher (or ADM/FTE) ratio. The percentage difference in cost varies from 13.4 percent to 479.1 percent.

During the course of our evaluation, we called the lack of enforcement of the existing rule to the attention of management in the Department's Vocational-Technical Education Division. Division managers promptly sent probation letters to those AVTIs that operated programs with less than the required 10:1 ratio in fiscal year 1981. They also drafted a procedure for use in enforcing the existing rule (see Figure 3).

TABLE 6

COMPARISON OF AVERAGE COST BY OCCUPATIONAL AREA: FISCAL YEAR 1981

	Average Cost Per ADM*		
Occupational Area	Low Enrollment Programs	All Other Programs	Percentage Difference
Agriculture	$3,927	$1,882	108.7%
Distributive Education	2,574	1,458	76.5
Health	2,893	1,781	62.4
Home Economics	2,925	2,019	44.9
Business/Office	3,129	1,698	84.3
Technical	2,823	1,822	54.9
Trade/Industrial	2,586	1,985	30.3
OVERALL	$2,992	$1,854	61.4%

Source: Program Evaluation Division analysis of SDE data.

*Cost includes only direct program costs as in Table 5.

TABLE 7

COMPARISON OF AVERAGE COST IN MAJOR PROGRAM AREAS: FISCAL YEAR 1981

Major Program Area*	All Programs: Average ADM /FTE Ratio	All Programs: Average Cost	Programs With the Lowest ADM/FTE Ratio: Lowest ADM /FTE Ratio	Programs With the Lowest ADM/FTE Ratio: Average Cost for Lowest Ratio Program	Percentage Difference in Average Cost
Agricultural Production	13.4	$1,890	7.1	$4,686	147.9%
Agricultural Supplies/ Services	14.2	1,747	5.6	4,320	147.3
Fashion Merchandising	13.0	1,602	8.0	2,365	47.6
Dental Assistant	12.3	1,964	9.7	2,715	38.2
Medical Lab Tech	12.0	2,075	9.8	2,493	20.1
Ward Clerk	14.4	1,513	9.7	1,717	13.5
Licensed Practical Nurse	10.2	2,111	6.9	3,065	45.2
Nurses Aide	8.6	2,220	4.1	12,856	479.1
Apparel Specialist	11.4	1,879	7.5	2,748	46.2
Accounting	17.0	1,457	7.9	2,627	80.3
Data Entry	12.7	2,851	7.9	4,538	59.2
Business & Office Clerk	13.9	1,943	4.2	4,842	149.2
Stenographer/Clerk	10.9	2,142	4.6	4,636	116.4
General Secretary	15.0	1,876	8.1	3,967	111.5
Legal Secretary	17.3	1,430	9.1	2,619	83.1
Medical Secretary	14.5	1,828	7.5	2,837	55.2
Architectural Drafting	16.6	1,388	9.5	2,485	79.0
Communications Tech	13.1	2,444	9.6	2,929	19.8
Parts Person	10.6	2,629	3.6	3,201	21.8
Carpentry	16.0	1,582	9.4	2,712	71.4
Graphic Arts	15.9	2,452	9.0	2,854	16.4
Machine Shop	16.4	2,296	9.3	3,965	72.7
Food Preparation	13.5	2,480	9.6	3,542	42.8

Source: Program Evaluation Division analysis of SDE data.

*We define a major program as one offered by five or more AVTIs. Only major program areas with at least one low enrollment program (an ADM/FTE ratio less than ten) are included in this table.

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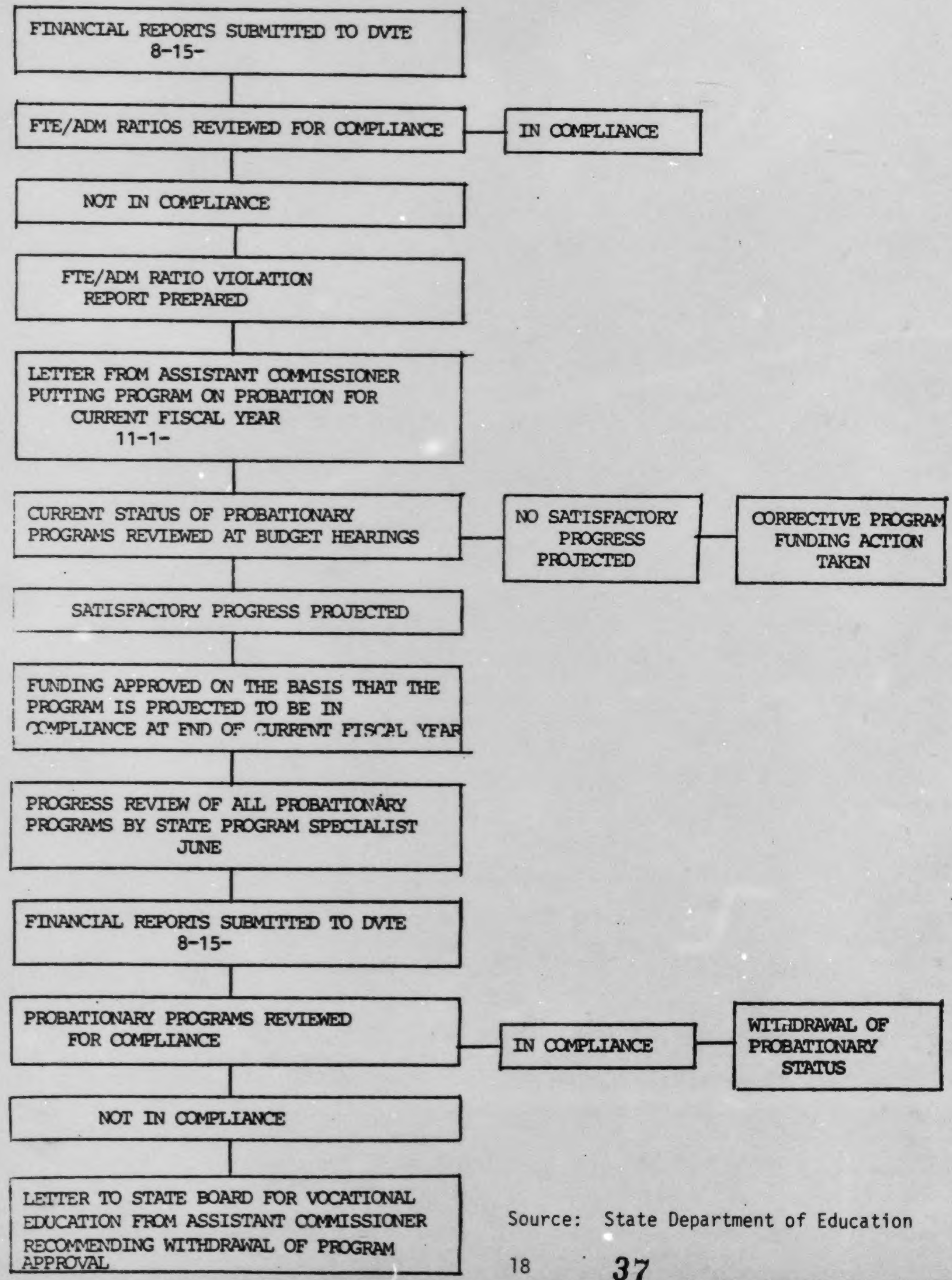
FIGURE 3

REVIEW PROCESS FOR MINIMUM ADM/FTE RATIO COMPLIANCE


FINANCIAL REPORTS SUBMITTED TO DVTE 8-15-
FTE/ADM RATIOS REVIEWED FOR COMPLIANCE
IN COMPLIANCE
NOT IN COMPLIANCE
FTE/ADM RATIO VIOLATION REPORT PREPARED
LETTER FROM ASSISTANT COMMISSIONER PUTTING PROGRAM ON PROBATION FOR CURRENT FISCAL YEAR 11-1-
CURRENT STATUS OF PROBATIONARY PROGRAMS REVIEWED AT BUDGET HEARINGS
NO SATISFACTORY PROGRESS PROJECTED
CORRECTIVE PROGRAM FUNDING ACTION TAKEN
SATISFACTORY PROGRESS PROJECTED
FUNDING APPROVED ON THE BASIS THAT THE PROGRAM IS PROJECTED TO BE IN COMPLIANCE AT END OF CURRENT FISCAL YEAR
PROGRESS REVIEW OF ALL PROBATIONARY PROGRAMS BY STATE PROGRAM SPECIALIST JUNE
FINANCIAL REPORTS SUBMITTED TO DVTE 8-15-
PROBATIONARY PROGRAMS REVIEWED FOR COMPLIANCE
IN COMPLIANCE
WITHDRAWAL OF PROBATIONARY STATUS
NOT IN COMPLIANCE
LETTER TO STATE BOARD FOR VOCATIONAL EDUCATION FROM ASSISTANT COMMISSIONER RECOMMENDING WITHDRAWAL OF PROGRAM APPROVAL

Source: State Department of Education

The Division's enforcement of the rule has begun to improve efficiency. In fiscal year 1982, the number of low enrollment programs declined from 81 in fiscal year 1981 to 58, or 7 percent of all programs. A number of programs that had ratios less than ten in 1981 increased those ratios to over ten in 1982. This was possible without terminating programs because the majority of low ratio programs in 1981 had more than two full-time teachers and about one-third had more than three full-time teachers. As a result, AVTIs were able to raise ratios above ten by making minor staffing adjustments or by operating fewer program sections.

In addition, further adjustments, including the termination of some programs, are occurring in fiscal year 1983. Because of budget cuts, AVTIs voluntarily terminated seven of the programs that had student/teacher ratios less than ten in 1982. These programs are not being offered in fiscal year 1983. The Division of Vocational-Technical Education is also recommending to the State Board that six programs that had ratios under ten in both 1981 and 1982 be terminated.

B. ADEQUACY OF THE PRESENT STANDARD

In 1980, the Legislature directed the State Board for Vocational Education to promulgate rules that specify appropriate minimum ADM/FTE ratios for each of the seven broad occupational areas (agriculture, distributive education, health, home economics, business and office, technical, and trade and industrial).[2] Legislative intent was apparently to achieve a higher minimum ADM/FTE ratio standard in occupational areas where a higher standard is reasonable and efficient. While the existing minimum standard of 10:1 may be appropriate for some program areas such as health, it may be too low in other programs areas such as business and office.

However, the State Department of Education and the State Board have not yet drafted new ADM/FTE standards. In order to judge whether the current ADM/FTE standard is adequate and whether a higher standard is reasonable for certain program areas, we interviewed Division of Vocational-Technical Education program supervisors, reviewed division files, examined current ADM ratios, and compared the ratios of similar programs in the AVTI and community college systems. We found that:

- Division program supervisors agreed that a minimum standard of 10:1 is too low for all occupational areas but health.

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[2] Minnesota Statutes §124.5621, Subdivision 13.

- In the past, Division of Vocational-Technical Education managers told the Department of Finance that a reasonable and efficient goal would be to average 17 ADMs per FTE in all areas except health. Although the systemwide average for all non-health programs has increased in recent years, it will likely be about 8 percent below 17.0 in fiscal year 1983.

- In many program areas, successful programs operate with student/teacher ratios above 15.0. Approximately 52 percent of all major programs (excluding health) had ratios of 15.0 or more in fiscal year 1981. About 77 percent of the programs had a ratio of 12.5 or more.

- Community college programs in the business and office area operate at considerably higher student/teacher ratios than comparable programs in the AVTIs.

Division program supervisors informed us that the current minimum ratio of 10:1 is generally too low for all areas except health. They differ over what standard is appropriate. All supervisors indicated that appropriate minimum standards for individual programs might vary from other programs in the same occupational area.

Similarly, division management has indicated in the past that it may be appropriate to distinguish between individual programs within the same occupational area. Despite some program differences, division management also indicated that an overall average ratio of 17:1 would be a reasonable and efficient goal for all AVTI programs except health programs:

> "The schools have been advised that with the exception of health, a reasonable and efficient goal is 17 ADMs per FTE teacher. . . . Each program cluster has unique instructional programs that are exceptions to an average such as 17. . . . It would not be possible to itemize the reasons why each program that is not 17 is uniquely different. Some of the more common reasons are that in areas such as business and office and technical, large group instruction with individualized progress allows for a large class size. Similarly, many programs in the Agriculture and Trades and Industry areas are limited by facilities and equipment available as well as safety resources in the supervision of students."[3]

The AVTI system has not, however, achieved that goal. Although the systemwide average for non-health programs has risen in recent years, it still remains below 17.0 ADMs per FTE. Table 8 shows the average ratios for each occupational area over the last four years and the projected ratios for fiscal year 1983. None of the occupational areas has yet achieved the goal of 17.0. Table 8 also includes the overall ratios achieved when staff in related instruction are included in the FTE totals. Including related instructors is appropriate since they also provide instruction to support regular programs. In the last year, the Division has been moving in the direction of allocating related staff FTE to instructional programs. Special needs instructors are not included in the totals since they provide remedial instruction to allow disadvantaged individuals to participate in regular instructional programs.

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[3] Division of Vocational-Technical Education memorandum to the Minnesota Department of Finance, November 27, 1978.

TABLE 8

STUDENT/TEACHER RATIOS BY OCCUPATIONAL AREA: FISCAL YEARS 1979-1983

Occupational Area	1979	1980	1981	1982	Projected 1983
Agriculture	12.4	12.7	13.0	13.9	14.7
Distributive Education	14.6	14.3	15.1	14.5	16.3
Health	10.1	10.5	10.8	10.9	11.3
Home Economics	10.6	12.3	12.7	14.2	15.2
Business/Office	14.2	14.7	15.9	16.0	16.3
Technical	15.4	15.0	15.7	16.0	15.8
Trade/Industrial	13.8	14.3	15.4	15.0	15.6
OVERALL RATIO	13.5	13.9	14.7	14.7	15.2
OVERALL RATIO (Excluding Health)	13.9	14.3	15.3	15.2	15.7
OVERALL RATIO (Including Related Instructors)	12.8	13.3	14.2	14.3	15.1

Source: Program Evaluation Division analysis of SDE data.

We also found that large differences in ADM/FTE ratios exist among AVTIs offering very similar programs. Although some variation might be expected because of differences in the size of facilities and available equipment, the differences also appear to be due to a lack of student demand for certain programs at particular AVTIs. In some cases, the lack of demand may be the result of having a number of AVTIs or community colleges offering the same or very similar program in the same geographic area.[4] Tables 9 and 10 show that many non-health programs have ratios of 15.0 or more. About 52 percent of all non-health programs in major program areas had ratios of 15.0 or more in fiscal year 1981. About 77 percent of the programs had a ratio of 12.5 or more. However, in addition to the programs that failed to meet the current standard of 10.0 ADMs per FTE (representing about 7 percent of all non-health programs), another 16 percent of all non-health programs barely met the standard (see Figure 4). These programs had ratios between 10.00 and 12.49. Furthermore, programs similar to many of these programs are operated successfully at other AVTIs at ratios of 12.5 and higher.

We also compared student/teacher ratios for three programs in the business and office and distributive education areas that are offered widely in both the AVTI and community college systems. We found that the community college programs had considerably higher student/teacher ratios than AVTI programs in fiscal year 1981. These results are illustrated in Table 11. It should be noted that these AVTI programs have ratios generally higher than the average AVTI program. However, the comparison indicates that classroom programs of this type should be expected to achieve a higher ratio than the typical AVTI program. This is an area in which the minimum ADM/FTE standard could be raised substantially above the current 10:1 ratio.

Systemwide average ratios of 17 in non-health programs and 12 in health programs seem to be reasonable goals for the AVTI system. If achieved, the savings from improving program efficiency would be substantial. We estimate that achieving these goals could save between $4 and $5 million.[5]

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[4] The subject of program overlap is explored in greater detail in the next chapter.

[5] This figure includes a reduction in state expenditures for social security and retirement contributions as well as state aids.

TABLE 9

FREQUENCY DISTRIBUTION OF ADM/FTE RATIOS FOR MAJOR PROGRAMS FISCAL YEAR 1981

Major Program	Total Programs	Number of Programs with Ratios Between							Average ADM/FTE Ratio
		0-7.49	7.5-9.99	10.0-12.49	12.5-14.99	15.0-17.49	17.5-19.99	Above 20.0	
Agricultural Production	11	1	2	1	5	1	1	0	13.4
Agricultural Supplies/ Services	7	1	2	1	1	1	0	1	14.2
Farm Equipment Mechanic	6	0	0	1	2	2	1	0	14.9
Fashion Merchandising	9	0	2	3	0	2	0	2	13.0
Sales and Marketing	17	0	0	4	5	2	3	3	16.9
Dental Assistant	9	0	1	4	3	1	0	0	12.3
Medical Lab Assistant	6	0	1	2	3	0	0	0	12.0
Ward Clerk	7	0	1	0	2	4	0	0	14.4
Licensed Practical Nurse	21	1	7	12	1	0	0	0	10.2
Nurse's Aide	11	2	2	5	0	2	0	0	8.6
Child Care Assistant	5	0	0	1	2	1	1	0	14.3
Apparel Specialist	5	1	1	0	2	1	0	0	11.4
Accounting	27	0	1	3	3	8	3	9	17.0
Bank Clerk	5	0	0	1	2	0	2	0	14.9
Practical Business Management	5	0	0	3	0	2	0	0	13.1
Data Entry	5	0	1	1	2	0	0	1	12.7
Data Processing II	8	0	0	0	2	1	2	3	18.5
Business/Office Clerk	21	1	1	4	8	2	3	2	13.9
Stenographer/Clerk	5	1	0	3	0	0	1	0	10.9
General Secretary	25	0	2	3	7	5	4	4	15.0
Legal Secretary	15	0	1	2	4	3	0	5	17.3
Medical Secretary	16	1	1	5	3	3	0	3	14.5
Architectural Drafting	8	0	1	0	0	3	4	0	16.6
Civil Highway Technician	7	0	0	1	3	3	0	0	14.4
Electronics Technician	17	0	0	0	6	3	7	1	16.5
Communications Technician	5	0	1	1	1	1	1	0	13.1
Fluid Power Technician	5	0	0	1	0	1	0	3	15.5
Air Conditioning/Heating	7	0	0	0	1	2	3	1	17.6
Auto Body	17	0	0	1	8	4	4	0	15.4
Auto Mechanics	28	0	0	9	7	10	2	0	13.9
Parts Person	14	1	7	3	1	0	2	0	10.6
Commercial Art	7	0	0	0	3	3	1	0	16.2
Carpentry	17	0	1	1	4	1	5	5	16.0
Electrical	13	0	0	2	1	4	3	3	16.9
Plumbing	5	0	0	1	1	1	1	1	16.2
Maintenance Mechanic	6	0	0	0	2	4	0	0	16.3
Diesel/Truck Mechanic	13	0	0	1	2	4	5	1	16.6
Truck Driving	5	0	0	3	0	1	1	0	12.6
Mechanical Drafting	14	0	0	1	4	5	3	1	15.7
Graphic Arts	10	0	1	1	4	1	1	2	15.9
Machine Shop	13	0	1	1	1	6	3	1	16.4
Welding	25	0	0	3	8	7	6	1	15.2
Tool and Die	8	0	0	1	1	5	1	0	16.0
Cosmetology	8	0	0	2	2	2	0	2	15.9
Food Preparation	14	0	1	4	4	5	0	0	13.5
Small Engine Repair	9	0	0	0	3	2	3	1	16.7
TOTALS	521	10	39	96	124	119	77	56	14.8

Source: Program Evaluation Division analysis of SDE data.

TABLE 10

SUMMARY OF ADM/FTE RATIOS FOR MAJOR PROGRAMS
FISCAL YEAR 1981

	Number of Programs	Percentage of Programs in Each Category						
		0-7.49 ADM/FTE	7.50-9.99 ADM/FTE	10.00-12.49 ADM/FTE	12.50-14.99 ADM/FTE	15.00-17.49 ADM/FTE	17.50-19.99 ADM/FTE	20.00 or More ADM/FTE
Health	54	5.5%	22.2%	42.6%	16.7%	13.0%	--	--
Non-Health	467	1.5	5.8	15.6	24.6	24.0	16.5	12.0
OVERALL	521	1.9%	7.5%	18.4%	23.8%	22.8%	14.8%	10.8%

Source: Program Evaluation Division analysis of SDE data.

FIGURE 4

STUDENT/TEACHER RATIOS
FOR MAJOR PROGRAMS EXCLUDING HEALTH
Fiscal Year 1981

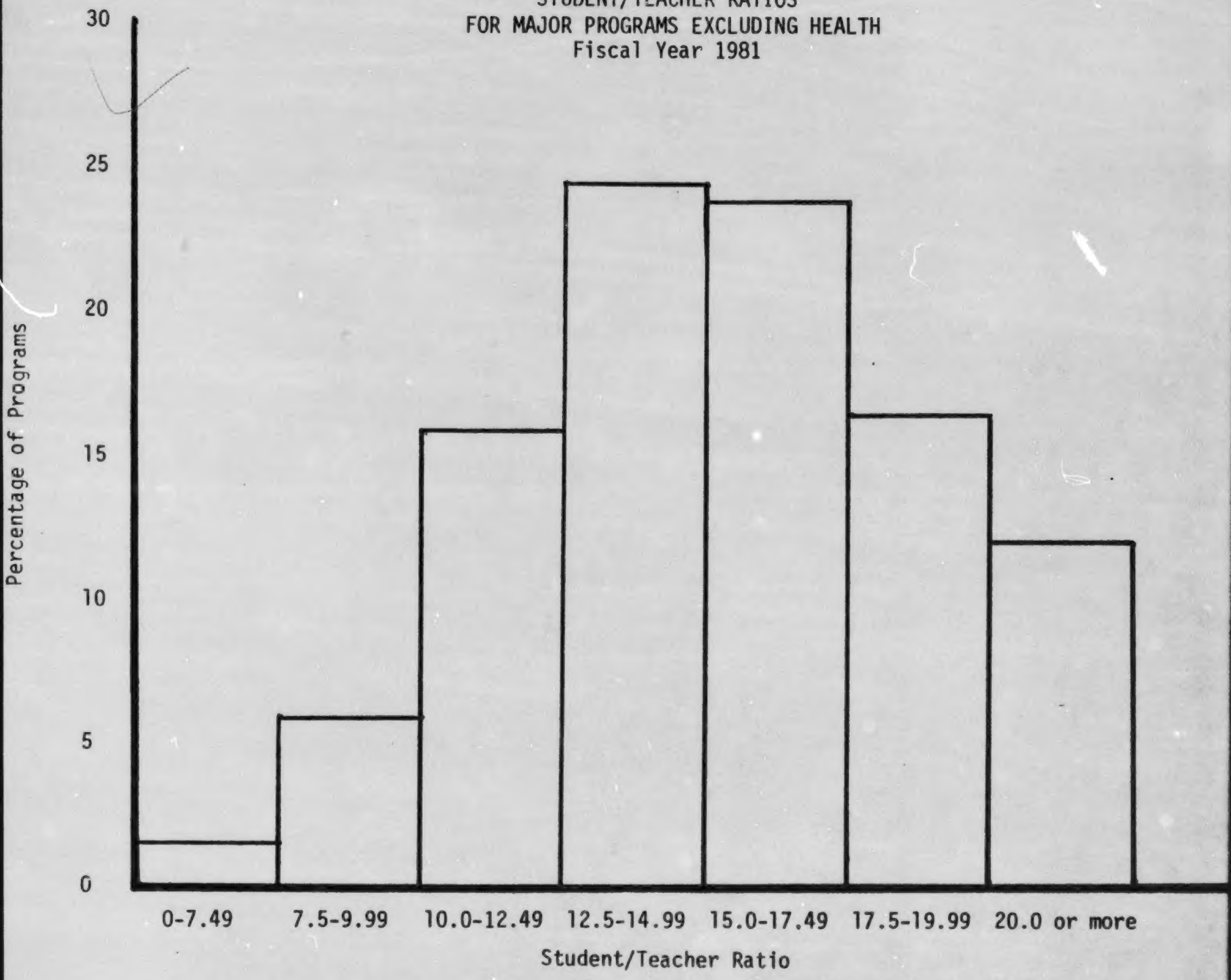

TABLE 11

COMPARISON OF STUDENT/TEACHER RATIOS IN SELECTED PROGRAMS FISCAL YEAR 1981

Program	Community Colleges	AVTIs	Percentage Difference
Accounting	23.8	17.0	40.0%
Marketing	24.6	16.9	45.6
General Secretary	18.4	15.0	22.7

Source: Program Evaluation Division analysis of SDE and Community College Board data.

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III. PROGRAM DUPLICATION

The Legislature has clearly recognized the need to avoid unnecessary duplication of vocational programs, as well as other post-secondary instructional programs. In 1971, the Legislature gave the Higher Education Coordinating Board (HECB) two significant responsibilities:

> (1) To "review, make recommendations and identify priorities with respect to all plans and proposals for new or additional programs of instruction or substantial changes in existing programs to be established in or offered by, the University of Minnesota, the state universities, the state junior colleges and public area vocational-technical schools,"
>
> and
>
> (2) To "periodically review existing programs offered in or by the above institutions and recommend discontinuing or modifying any existing program, the continuation of which is judged by the commission as being unnecessary or a needless duplication of existing programs."[1]

We found, however, that while HECB has reviewed proposals to add new vocational programs or substantially change existing ones, neither HECB nor the State Board for Vocational Education periodically review existing vocational education programs for unnecessary duplication. Efforts to control vocational program overlap or duplication have focused on proposals to add new programs or increase the length of existing ones. This approach is inadequate since it fails to consider whether unnecessary program overlap or duplication already exists among current programs. As a result, we reviewed vocational programs in the AVTI and community college systems to determine the extent to which unnecessary duplication exists. The first section of this chapter reviews the extent to which AVTI and community college programs in vocational education duplicate one another. The second section of the chapter examines whether any of this duplication or overlap can be considered unnecessary or an inefficient use of resources. Finally, our findings are discussed in light of the trade-off that exists between promoting accessibility to programs and achieving greater efficiency in the use of resources.

A. EXTENT OF PROGRAM DUPLICATION

To determine the extent of overlap among post-secondary vocational programs, we examined programs offered by the AVTIs and the community colleges during fiscal year 1981. Programs offered by state universities and the technical colleges of the University of Minnesota were not included in our review since comparable data on student/teacher ratios were not readily available. Since the AVTIs and community colleges together offer more than 90 percent of all public post-secondary non-baccalaureate vocational programs, the omission of the state universities and the University of Minnesota is not too significant for an analysis of program duplication. For the purposes of this study, two programs were said to be overlapped with each other if the programs trained students for identical or very similar jobs and the programs were offered within 65 miles of each other.[2]

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[1] Laws of 1971, Ch. 269, Section 1. HECB was then known as the Higher Education Coordinating Commission. Community colleges were then known as junior colleges.

Post-secondary vocational programs are offered from at least 34 different locations by the AVTIs and 18 different locations by the community colleges.[3] As can be seen from Figure 5, the area with the greatest potential for program overlap is the metropolitan Twin Cities area. There are six AVTIs and six community colleges within the metropolitan area. These schools are all well within a 65-mile radius of each other. There is also good potential for overlap in the six outstate communities (Thief River Falls, Hibbing, Brainerd, Willmar, Rochester, and Austin) that have both an AVTI and a community college. Of course, any two schools within 65 miles of each other have the potential for program overlap. The key is whether they offer the same programs.

We found a significant amount of program overlap. Statewide, 58 percent of vocational programs operate within 65 miles of at least one other similar program. On average, each overlapped program overlaps with more than three other programs.

The frequency of overlap is higher in the AVTIs (60 percent) than in the community colleges (49 percent). As expected, program overlap is more prevalent in the metropolitan area, particularly among AVTI programs. In the metropolitan area, 80 percent of the AVTI programs are overlapped compared with 52 percent of the

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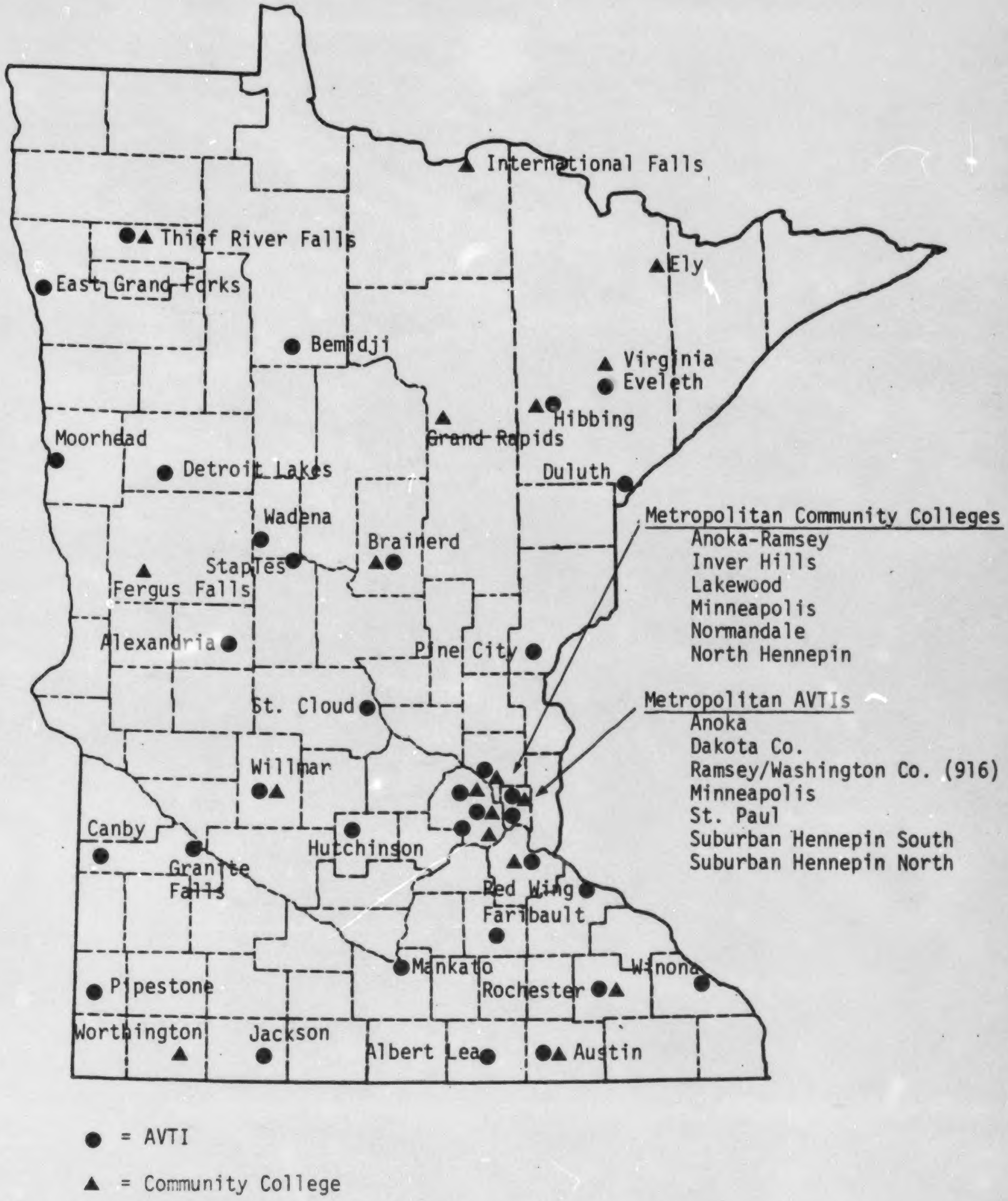
[2] Within the AVTI system, each program is assigned a six digit OE (Office of Education) code to identify the type of job for which students will be receiving training. This code was used to identify similar AVTI programs. It is the same code used to identify similar programs for the purpose of computing state instructional aids. Because vocational programs at community colleges are not assigned this six digit OE code, it was necessary for us to categorize them by this code.

[3] In our analysis, Suburban Hennepin AVTI was treated as two schools since it offers programs at two different campuses in the metropolitan area. Five community colleges (Itasca, Hibbing, Mesabi, Vermillion, and Rainy River) in northeastern Minnesota were recently consolidated into one college (Arrowhead Community College). However, for purposes of this study, they were considered as five separate colleges since vocational programs are offered at each of the five locations.

FIGURE 5

LOCATION OF MINNESOTA'S AVTIs AND COMMUNITY COLLEGES



community college programs. Outside the metropolitan area, 50 percent of AVTI programs and 45 percent of community college programs are overlapped. Each overlapped program in the metropolitan area is also within 65 miles of a greater number of similar programs than each overlapped program in outstate Minnesota. Each overlapped AVTI program in the metropolitan area overlaps 4.1 similar programs on average. The average number of other programs overlapped is 6.1 for metropolitan community colleges, 2.3 for outstate AVTIs, and 2.1 for outstate community colleges. Table 12 presents these data.

Very little vocational program overlap exists as a direct result of having both an AVTI and a community college in each of six outstate communities. The percentage of overlapped programs at these 12 schools is about the same as for other outstate schools. Fifty-three (53) percent of the AVTI programs and 41 percent of the community college programs at these 12 schools are overlapped. Only one-tenth of this overlap, however, results because two schools in the same community offer the same program. Also, in four of the six communities, the AVTI and community college cooperatively offer an associate degree program.

It is important to note that most of the overlap in AVTI programs exists because of overlap within the AVTI system rather than between the AVTI and community college systems. If only overlap within the AVTI system is considered, the percentage of AVTI programs overlapped drops only slightly, from 60 percent to 58 percent. This fact indicates that even if the community colleges offered no vocational programs, the AVTI system would have a significant problem with program overlap. In contrast, the percentage of community college programs overlapped drops from 49 percent to 27 percent if overlap with the AVTIs is excluded. This occurs because few outstate community colleges are within 65 miles of each other.

B. UNNECESSARY PROGRAM DUPLICATION

Unnecessary program duplication exists when there are too many suppliers of a program for existing student demand. Just because two or more similar programs are offered within 65 miles of one another does not necessarily mean that a problem exists. If two overlapped programs are operating efficiently, as measured by their student/teacher ratios, then little may be gained by consolidating the programs into a single location. Low student/teacher ratios, however, would indicate that some unnecessary duplication is occurring and that staff can be utilized more efficiently.

Consequently, we examined the student/teacher ratios of the programs that overlapped. We found that 6 percent of all AVTI programs and 3 percent of all community college programs were overlapped and also had a ratio less than 10.0 during fiscal year 1981. The problem was most prevalent among metropolitan AVTIs. Ten percent of metropolitan AVTI programs were overlapped and also had less than ten ADMs per full-time instructor.

TABLE 12

PROGRAM OVERLAP IN THE AVTIs AND COMMUNITY COLLEGES FISCAL YEAR 1981

	Overlapped Programs	Total Programs	Percentage Overlapped	Average Number of Other Programs That Each Program Overlaps
Metropolitan AVTIs	222	277	80%	4.1
Outstate AVTIs	263	527	50	2.3
Metropolitan Community Colleges	45	86	52	6.1
Outstate Community Colleges	38	85	45	2.1
Statewide	568	975	58%	3.3

Source: Program Evaluation Division analysis of data provided by the State Department of Education and the Community College Board.

Since we observed earlier that the required minimum ratio for non-health programs is too low, we also identified overlapped non-health programs with ratios between 10.0 and 15.0.[4] Adding those programs to the ones with ratios below 10.0, we find that:

- 25 percent of all AVTI programs and 10 percent of community college programs were overlapped and also had low student/instructor ratios.
- The problem was the greatest among metropolitan AVTIs, where 32 percent of all programs were overlapped and also had low ratios.

Table 13 presents these data.

It should be noted that much of the inefficiency in the AVTI system would exist even if community college programs were not considered. If only duplication within the AVTI system is considered, the percentage of all AVTI programs that were overlapped and also had low student/teacher ratios drops only slightly, from 25 to 24 percent. In contrast, the percentage of community college programs drops from 10 to 2 percent if overlap with the AVTIs is excluded.

C. DISCUSSION

Past state policy has generally promoted student accessibility to vocational programs. This has resulted in there being a large number of schools that offer post-secondary vocational training. It has also contributed to the high degree of program overlap we found. In an era when state and federal resources are declining, however, it is appropriate to ask whether the state should continue to fund two or more similar programs in the same geographic vicinity, if those programs are operating with relatively low student/teacher ratios. The problem will also cause increasing concern in the late 1980s and 1990s if overall enrollment declines as projected.

It is generally assumed that the greatest compromises of efficiency in order to achieve accessibility have been in the less densely populated areas of the state. The analysis presented here indicates otherwise. There appear to be significant opportunities in the metropolitan area for improving efficiency and reducing duplication without greatly affecting accessibility. Among metropolitan AVTIs

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[4] Use of the ratio of 15.0 provides a rough indication of how many overlapped non-health programs may also be inefficiently operated. However, the ratio of 15.0 may be too high for some programs while not high enough for others. Once the State Department of Education develops new standards, those standards could be used instead of a ratio of 15.0.

TABLE 13

PROGRAM OVERLAP AND STUDENT/TEACHER RATIOS
FISCAL YEAR 1981

	Overlapped Programs with a Ratio Less Than 10.0		Overlapped Non-Health Programs with a Ratio Less than 15.0 Plus Overlapped Health Programs with a Ratio Less Than 10.0	
	Number	Percentage*	Number	Percentage*
Metropolitan AVTIs	27	10%	90	32%
Outstate AVTIs	20	4	112	21
Subtotal	47	6%	202	25%
Metropolitan Community Colleges	3	3%	4	5%
Outstate Community Colleges	2	2	13	15
Subtotal	5	3%	17	10%
Overall	52	5%	219	22%

Source: Program Evaluation Division analysis of data provided by the State Department of Education and the Community College Board.

*The number of overlapped programs with low student/teacher ratios is calculated as a percentage of all vocational programs offered.

where the problem appears the greatest, some consolidation of programs can certainly be achieved without a major impact on students' commuting distances. Some of the inefficiency could be eliminated by improving student/teacher ratios rather than terminating programs. Ratios can be improved if student enrollment increases or the number of full-time equivalent instructors in a program is reduced. In many instances, programs with low ratios have several instructors. Thus, it is more probable in these cases that ratios can be improved without eliminating any progams.

Outside the metropolitan area, some consolidation and improvement in ratios can also be achieved. However, the trade-off between student access to vocational training and efficiency in the provision of training is of greater concern than in the metropolitan area. Consolidating outstate programs may require some students to travel significantly greater distances or to relocate in order to enroll in a particular type of program. While these impacts should be a consideration, a recent study by HECB found that the AVTIs are already enrolling a surprisingly high proportion of new students from outside the regions where the outstate AVTIs are located. In the fall of 1978, 62 percent of new entering students came from outside the counties and 37 percent came from outside the planning regions where the AVTIs are located. These percentages are not as high as those for state universities (84 percent and 69 percent respectively) or outstate University of Minnesota campuses (74 percent and 62 percent) but are higher than those for outstate community colleges (38 percent and 19 percent).[5] Since many students attending outstate AVTIs already indicate a willingness to travel, there may be room to reduce the amount of program overlap in outstate Minnesota, as well as in the metropolitan area.

It should be noted that the average student/teacher ratio in fiscal year 1983 will likely be higher than in 1981. As a result, some gain in efficiency has been achieved. The percentage of programs that are overlapped and have low ratios will likely decline in 1983.

However, as pointed out in Chapter II, additional improvements are both possible and desirable. Reviewing those programs that are duplicated in the same geographic vicinity and have low student/teacher ratios is a sound approach toward achieving greater efficiency.

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[5] Interim Report on Minnesota System of Area Vocational-Technical Institutes, Minnesota Higher Education Coordinating Board, 1980, pp. 87-97.

IV. COMPLETION RATES

An important factor in any educational system's performance is the percentage of its students that complete their training. In the AVTI system, students completing training include both program graduates and students who do not graduate but complete enough training to acquire a marketable skill and find a related job. Overall, approximately two-thirds of the students leaving the AVTI system during recent years had completed a vocational program or at least acquired a marketable skill. One-third left without acquiring a marketable skill (see Table 14).

TABLE 14

COMPLETION AND DROPOUT RATES
FISCAL YEARS 1980 - 1982

	1980	1981	1982
Graduates	55.2%	57.1%	60.1%
Completed Training Objectives (acquired a marketable skill)	10.7	9.4	9.4
Subtotal: Completion Rate*	65.9%	65.5%	69.5%
Dropout Rate	34.1%	33.4%	30.5%

Source: Termination Reports, Minnesota Vocational Follow-Up System.

*Subtotals may differ from sum of the two categories due to rounding.

Although the percentage of dropouts seems high, it is important to know if the dropout problem is concentrated in a relatively small percentage of programs. If the problem is concentrated, it may be easier to manage and control. As a result, we calculated the completion and dropout rates for all AVTI programs that were offered during fiscal years 1980 and 1981. Data from the two years were combined. This was done to minimize the possibility that year-to-year fluctuations in completions or enrollment might affect the results.[1]

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[1] Ideally a completion or dropout rate would be calculated by following a specific group of students who enroll during the same period of time. However, the available data do not permit this. As a result, the completion rate is defined as the number of students who graduate or acquire a marketable skill as a percentage of those who leave the AVTI during a given fiscal year.

We found that, while most AVTI programs had a satisfactory completion rate, a significant number do not. In particular, we found that at least 19 percent of all AVTI programs had a dropout rate of 50 percent or more. Table 15 presents the results by broad occupational area. The data used to calculate dropout rates may underestimate the problem for individual programs. Students who transfer from one program to another at the same AVTI may be counted as completions from the second program but are not counted as dropouts from the first. This is an acceptable procedure for determining a school's dropout rate. However, the data will understate the dropout rate for individual programs.

TABLE 15

PERCENTAGE OF PROGRAMS WITH DROPOUT RATES OF 50 PERCENT OR MORE

	Percentage of Programs*
Agriculture	15%
Distributive Education	30
Health	6
Home Economics	10
Business/Office	20
Technical	27
Trade/Industrial	19
State Average	19%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*Since data on the follow-up system define programs by an 8-digit code, this is the percentage of all programs having an 8-digit code.

We also found that insufficient attention has been paid to dropout problems. There have been few attempts by the State Department of Education to identify programs with high dropout rates, evaluate the reasons for the problem, and assist the AVTIs in taking corrective action. The Department has calculated student/teacher (ADM/FTE) ratios for individual programs and used them to monitor program efficiency. However, student/teacher ratios alone are not sufficient. Programs with a high dropout rate may not have low student/teacher ratios. The longer students stay in a program before dropping out the greater the problem with using student/teacher ratios alone. This is because those dropouts will be included in the program's ADM count during the time they are in the program. Dropouts leaving after the fifteenth day of a quarter are also included in a program's ADM after they leave until the school either fills the vacancy created or the quarter ends. Of the 81 programs that had an ADM/FTE ratio less than ten in fiscal year 1981, only nine had dropout rates of 50 percent or more in our analysis.

It is clear that the State Department of Education and the AVTIs should be identifying programs with dropout rates and attempting to determine the reasons for the problem. Some data that are already collected may be helpful in this process. When students drop out, their instructors are asked to list the primary reason why the student dropped. While these data may be less objective than if the students themselves were surveyed, they may provide some insights.

Table 16 shows the reasons instructors list for student dropouts. The data include all dropouts. It would be better for the Department to focus on the reasons given in only those programs that have high dropout rates.

TABLE 16

REASONS WHY STUDENTS WITHDREW FISCAL YEARS 1980 - 1982

	1980	1981	1982
Reason Unknown	21.6%	23.6%	21.5%
Personal Problems	24.0	22.7	21.4
Unsatisfactory Program Performance	20.1	20.6	20.5
Economic Reasons	15.0	15.2	17.2
Lack of Interest by Student	9.8	9.4	10.0
Transferred to Another AVTI	4.6	3.6	4.1
Transferred to a College or University	3.4	2.9	3.1
Transferred to Other Institution	1.6	2.0	2.2
TOTAL*	100.1%	100.0%	100.0%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*Total may not equal 100.0% due to rounding.

V. RELATED PLACEMENT RATES

The principal mission of the AVTI system can be summarized by the following statement:

> To efficiently and effectively train students and place them in related occupations where they will be successful.[1]

Obviously, a major objective of AVTI programs should be to place a high percentage of their students in jobs related to their training. As a result, it is possible to more precisely measure and evaluate the benefits of vocational education than other types of education.

In the past, it has generally been reported that AVTIs have had considerable success in placing students in related jobs. Related placement rates of 90 to 95 percent have been cited by vocational education advocates as being typical. Rates averaging about 90 percent statewide have been reported by the AVTIs to the Division of Vocational-Technical Education of the State Department of Education. The opinions of either AVTI teachers or placement personnel are used by the AVTIs to determine whether a graduate has a related job. These reports indicate that only two programs had an average related placement rate of 50 percent or less over the three-year period covering fiscal years 1977 through 1979.

The AVTI reports suggest that there are few placement problems in AVTI programs. However, we found that the extensive and more objective data contained in the Minnesota Vocational Follow-Up System contradict these reports. Using data from the follow-up system, we found that, even prior to the current economic recession:

- Up to one-fourth of all AVTI programs had problems with related placement rates that merit close attention.

- In at least 10 percent of all programs, the problems are severe.

Most AVTI programs, particularly those in technical, health, and some trade and industrial occupations, have been successful. Although the percentage of graduates with related jobs is less than that reported by the schools and vocational advocates, it is reasonably high for most programs. However, the AVTI system has continued to offer a significant number of programs that have not been very successful.

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[1] A Plan for Operating Post-Secondary Vocational Technical Education During the 1980s, prepared by Educational Management Services, Inc. for the Minnesota State Board for Vocational Education, May 1981, p. 2.

These findings are surprising considering the fact that the Division of Vocational-Technical Education has spent considerable funds over the last decade to design, operate, and maintain the Minnesota Vocational Follow-Up System. Each year this system surveys graduates of AVTI programs regarding their employment status and opinions on the training they received. In addition, their employers are surveyed regarding the skills and work attitudes of AVTI graduates. The system is clearly superior to any used by other Minnesota post-secondary systems operating vocational programs. In fact, the system is undoubtedly one of the finest in the nation.

There are at least two reasons, however, why the results generated by the system have not had much impact on AVTI programs:

1) Placement and other data have not generally been used for program evaluation or budgeting or for management decisions at the state or local level; and

2) The State Board's rule on placement does not even mention that placements should be related to training. The rule only requires that more than 50 percent of all graduates who have completed their educational objectives and are available for employment be employed in order for a program to continue to operate.[2]

Clearly, the results from the follow-up system have been largely ignored. The remainder of this chapter examines AVTI related placement rates. First, we explore the alternative ways of measuring and calculating related placement rates. Second, systemwide placement rates over the last five years are reviewed. Third, the performance of individual AVTI programs over this time period is examined in detail. Finally, we briefly evaluate some major changes the Division of Vocational-Technical Education is planning to make in the follow-up system over the next few years.

A. MEASURING RELATED PLACEMENT RATES

Related placement rates can vary greatly depending on how placement is measured. Four key issues need to be resolved before one can begin to measure related placement rates. These issues are:

1) What source of data should be used? Should one use teacher reported data or data obtained by surveying graduates on their employment status?

2) How should the relatedness of jobs to training be defined or measured?

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[2] See MCAR §1.0102H.

3) How soon after graduation should the employment status of graduates be reviewed?

4) Should the placement rate be calculated by dividing the number of graduates with related jobs by the total number of graduates or just the number of graduates who say they are available for work?

1. DATA SOURCE

There are two available sources of placement data for AVTI programs. One is the data reported by AVTIs. The other is that collected by the Minnesota Vocational Follow-Up System by surveying students. There are several important reasons why the follow-up data should be used instead of the school reported data. First, it is generally acknowledged that teacher or school reported results tend to be less objective than those obtained by surveying graduates and then making a systematic comparison of their jobs to their training. One study found only a 55 percent correspondence between the judgments of teachers on job relatedness and judgments made by comparing the occupation skills of selected jobs to students' training.[3] Second, AVTIs do not submit documentation with their placement reports on each student's job or the method used to decide whether that job was related to training. As a result, it is difficult to verify whether AVTI data on relatedness are accurate. Third, the Division of Vocational-Technical Education does not provide AVTIs with sufficient guidance on how to determine relatedness. Finally, as we will see later in this chapter, student opinion on job relatedness is not consistent with teacher opinion. Student opinion comes out between two objective measures of relatedness used in the follow-up system. Both of these measures, as well as student opinion, show related placement rates to be less than those reported by AVTIs.

2. RELATEDNESS OF JOB TO TRAINING

The follow-up system defines related placement in two ways: (1) jobs that are closely related to a student's training and (2) jobs that are broadly but not closely related to a student's training. A job is closely related to one's training if the job title or skills the surveyed graduate reports appear to be similar to the training received. For example, if a graduate from an electrician program is employed as an electrician, then the graduate's job is said to be closely related to training. If the graduate is employed in any other occupation included in the trade or industrial area, then the graduate's job is broadly related to training. If the graduate is employed in a job assigned to any of the other broad occupational areas (agriculture, distributive education, health, home economics, business and office, or technical), then the graduate's job is classified as unrelated to training.

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[3] Elinor Woods and Walt Haney, Does Vocational Education Make a Difference? A Review of Previous Research and Reanalyses of National Longitudinal Data Sets (Cambridge, Massachusetts: The Huron Institute, 1981), Chapter 4, Sec. 5.

A related placement rate can then be calculated in either of two ways. One way is to include only closely related placements when calculating the rate. The second is to count both closely related and broadly related placements as related.

Neither measure is perfect. For some training programs, it is best to use the closely related measure. For others, the broadly related measure is more appropriate. In a few instances, some jobs classified as unrelated should perhaps be considered related.

One problem with using the broadly related measure is that the broad occupational categories, particularly the trade and industrial area, have included too many diverse occupations. For example, in the years we examined, graduates of any trade or industrial program employed as waiters or waitresses were considered to be in jobs broadly related to their training. A second problem is that the broadly related measure is not appropriate when measuring the placement success of highly specialized programs. For example, graduates of a program in mobile home construction and repair would be considered to be in a job broadly related to their training as long as they had a job in the construction trades or any other trade or industrial program area. However, if few graduates had jobs directly dealing with mobile homes, it would not be practical for the system to offer these programs since so many other construction trades programs are already offered. Only a closely related placement rate could detect whether this problem was occurring.

The closely related measure can be too restrictive for certain programs. For example, graduates of a general secretarial program would be considered to have broadly, but not closely, related jobs if they were employed as legal secretaries. In that particular case, the graduates should be considered to have jobs related to their training. The jobs are simply more specialized than those for which they were trained.

Although neither measure is perfect for all programs, it is reasonable to view the two measures as representing the lower and upper limits for measuring related placement rates. As a result, we use both measures in this chapter.

3. TIME OF STUDENT FOLLOW-UP

AVTIs report on the employment status of graduates several months after they leave school. The follow-up system measures employment status approximately one year after graduation. Since school reported data were rejected for other reasons, it was necessary for us to use the follow-up data and measure related placement one year after graduation.

Generally, related placement rates measured one year after graduation are higher than those measured only several months after graduation. This is because students may not be able to immediately find the job they want and may take an unrelated job until a related one becomes available.

The follow-up study provides data on a graduate's first job as well as on the job held one year after graduation. A related placement rate for first jobs could be calculated. However, it would be misleading as to the success of programs. The first job measure would significantly understate the extent to which graduates are unemployed or hold unrelated jobs. If a person held a related job for one month but was unemployed or held an unrelated job for the next eleven months, the first job measure would count the graduate as a related placement. Clearly, that would overstate the success of the program.

4. PERSONS UNAVAILABLE FOR EMPLOYMENT

The final issue in measuring related placement rates concerns how one treats the category of individuals who say that they are unavailable for employment. One school of thought suggests that those who are unavailable be subtracted from the number of graduates when placement rates are calculated. This procedure results in a higher placement rate than if we include those who are unavailable. Excluding the unavailable is said to be reasonable for two reasons. First, some of the unavailable are pursuing additional educational training. Second, schools should not be held accountable for students who later choose not to seek employment. As a result, it may be reasonable to exclude the unavailable. This is comparable to the procedure used when calculating the nation's unemployment rate.

Another school of thought suggests that a program's placement rate should be calculated by dividing the number of graduates with related jobs by the total number of program graduates, including those unavailable for work. This procedure also has justification. Some students may be unavailable for employment because they could not find a related job or any job they wanted and stopped looking. This group is analagous to the category of discouraged workers spoken of in connection with national unemployment rates. It is generally acknowledged that unemployment rates provide too optimistic a measure of unemployment problems because they exclude discouraged workers. Similarly, excluding the unavailable would provide too generous a measure of related placement since discouraged workers would not be counted.

Another reason for including the unavailable is that from the public's point of view the return to employers, students, and taxpayers depends on how many students get related jobs. For graduates who are unavailable, training has not resulted in any benefits for society but has required the expenditure of public funds. While a school is not responsible for a graduate's decision not to seek employment, policy decisions on what programs are offered should take into account what percentage of all students obtain related jobs. This implies that the unavailable should be included when calculating placement rates.

The follow-up survey asks graduates who say they are unavailable to indicate why. Table 17 shows how fiscal year 1980 and 1981 graduates responded. About one-fourth indicated that they were simply not interested in employment. About one-fifth, or a little more than one percent of all graduates, said they were still in training. It is not known, however, how many of these AVTI graduates pursuing further education were in educational areas related to their AVTI training. It could be argued that those in unrelated fields should be included when calculating placement rates. Those students may have pursued further education because of a lack of job opportunities in the field they trained for when at an AVTI.

While we believe that the unavailable should generally be included, we acknowledge that there are reasons for excluding some of them. Because the existing follow-up system does not permit us to distinguish between those who should and should not be included, placement rates in this chapter are calculated both ways.

A possible bias in the placement rates is that those who do not respond to the follow-up survey are more likely than respondents to be unemployed or not have related jobs. It is not known how significant this bias may be. However, the rates we calculate would overstate a program's success if this bias exists. This may be another reason to include the unavailable.

B. SYSTEMWIDE RELATED PLACEMENT RATES

Tables 18 and 19 show the related placement rates experienced by the AVTI system over the last five years. In Table 18 the unavailable are included, while in Table 19 they are excluded. Placement rates are about four percent higher when unavailable graduates are excluded. Placement rates are also about nine to ten percent higher when broadly related placements are included along with closely related placements.[4]

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[4] In calculating placement rates, the categories of "military" and "employed: no job information" were excluded. The first decision has virtually no impact on placement rates since fewer than 0.2 percent of AVTI graduates are in the military. Excluding the other could potentially result in placement rates that are understated. However, student opinion appears to indicate that only 40 percent of this group had related jobs. As a result, excluding this group may result in placement rates being overstated.

It should also be pointed out that part-time employees with related jobs have been counted when computing placement rates. As a result, it could be argued that placement success is overstated since some of those with related jobs are underemployed. About eight percent of the 1977-79 graduates with related jobs had part-time jobs. The percentage increased to about 11 percent for 1980-81 graduates.

TABLE 17

REASONS WHY STUDENTS WERE UNAVAILABLE ONE YEAR AFTER GRADUATION: FISCAL YEARS 1980 AND 1981 GRADUATES

	1980		1981	
	Percentage of Those Unavailable	Percentage of All Graduates*	Percentage of Those Unavailable	Percentage of All Graduates*
Not Interested in Employment	30.7%	1.8%	24.3%	1.4%
Change in Marital Status	22.8	1.4	28.6	1.7
In Training	20.0	1.2	21.9	1.3
Pregnant	17.7	1.1	16.3	0.9
Disabled	7.3	0.4	7.7	0.5
Unwilling to Move	1.5	0.1	1.2	0.1
Totals**	100.0%	6.0%	100.0%	5.8%

Source: Minnesota Vocational Follow-Up Reports.

*This is the number of students unavailable for a particular reason as a percentage of all students reporting their employment status one year after graduation.

**Sums do not always equal the totals due to rounding.

TABLE 18

RELATED PLACEMENT RATES ONE YEAR AFTER GRADUATION: UNAVAILABLE GRADUATES INCLUDED

Fiscal Year of Graduation	Closely Related		Closely and Broadly Related	
1977*	59.1%		69.8%	
1978	63.4		73.9	
1979	62.4		71.3	
1977-1979 Combined		62.1%		72.1%
1980	56.5		65.5	
1981	58.2		66.8	
1980-1981 Combined		57.3%		66.1%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*The rates reported for fiscal year 1977 are higher than those reported by the Minnesota Vocational Follow-Up System. Data on several programs were excluded in our analysis because it appeared that placements classified as broadly related should have been classified instead as closely related.

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TABLE 19

RELATED PLACEMENT RATES ONE YEAR AFTER GRADUATION: UNAVAILABLE GRADUATES EXCLUDED

Fiscal Year of Graduation	Closely Related	Closely and Broadly Related
1977*	64.4%	76.1%
1978	67.0	78.2
1979	66.3	75.8
1977-1979 Combined	66.2%	76.8%
1980	60.2	69.8
1981	61.9	71.1
1980-1981 Combined	61.1%	70.5%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*The rates reported for fiscal year 1977 are higher than those reported by the Minnesota Vocational Follow-Up System. Data on several programs were excluded in our analysis because it appeared that placements classified as broadly related should have been classified instead as closely related.

The current economic recession has had a definite impact as well. Rates for fiscal year 1980 and 1981 graduates are five to six percent lower than those for graduates from fiscal years 1977 through 1979.

Placement rates also vary by broad occupational area and by specific program area. Table 20 shows the closely related placement rates for 1977-1979 graduates. Only programs that continued to operate in fiscal years 1980 and 1981 were included. The data show that technical, health, and trade and industrial programs had the best average placement rates. Home economics and distributive education programs had the lowest placement rates.

In Table 21, closely related placement rates for each program area are presented. A wide variability in rates can be seen among programs. Quite a few program areas averaged 50 percent or less during the three year period covering 1977-1979 graduates.

C. RATES FOR INDIVIDUAL PROGRAMS

The most important placement statistic is one that shows what percentage of the approximately 800 AVTI programs had a low related placement rate. We recognize that there will always be a certain number of students who choose to pursue an occupation different from the one for which they trained. As a result, it is not reasonable to expect all programs to achieve related placement rates of 90 percent or more. However, it seems quite reasonable to expect each program achieve at least a 51 percent related placement rate. If most of a program's graduates are choosing an occupation other than the one for which they trained, then there clearly is a problem with the program.

We calculated the percentage of AVTI programs with related placement rates of 50 percent or less. Table 22 presents these data for fiscal year 1977-1979 graduates. Tables 23 and 24 present the data for fiscal year 1980 and 1981 graduates. The percentage of programs with low placement is calculated four alternative ways in each table. Placement rates were calculated both including and excluding broadly related placements and including and excluding graduates unavailable for employment.

The data clearly indicate that a significant problem exists. For 1977-1979 graduates, we found that:

- In 28 percent of all programs, 50 percent or fewer of the graduates were employed in a job closely related to their training one year after graduation.
- If broadly related placements are included, 13 percent of all programs had related placement rates of 50 percent or less.

TABLE 20

1977 - 1979 CLOSELY RELATED PLACEMENT RATES BY OCCUPATIONAL AREA FOR PROGRAMS OPERATING IN FISCAL YEARS 1980 AND 1981

Occupational Area	Major Programs	Minor Programs	All Programs
Agriculture	68.4%	51.4%	60.6%
Distributive Education	55.9	57.7	56.7
Health	65.6	60.9	64.7
Home Economics	49.3	42.5	47.2
Business and Office	61.7	61.4	61.7
Technical	76.1	72.2	74.8
Trade and Industrial	63.8	63.8	63.8
All Areas	63.8%	61.5%	63.3%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and the State Department of Education's Program Budget Reports.

*Placement rates are based on the graduate's status approximately one year after graduation. Unavailable graduates were included in these calculations.

TABLE 21

1977 - 1979 CLOSELY RELATED PLACEMENT RATES BY PROGRAM AREA FOR PROGRAMS OPERATING IN FISCAL YEARS 1980 AND 1981

AGRICULTURE

MAJOR PROGRAMS	
Agricultural Production	74%
Agricultural Supplies & Services	59
Farm Equipment Mechanic	74

MINOR PROGRAMS	
Horse Care/Livestock Management	31%
Farm Management	55
Farrier	33
Water Well Drilling	50*
Farm Buildings & Conveniences	55
Horticulture Aide	44
Specialty Crop Production	0*
Floral Production	42
Landscape Technician	57
Natural Resources Technician	64
Land Construction Conservation	78
Forest Harvest Technician	29

DISTRIBUTIVE EDUCATION

MAJOR PROGRAMS	
Fashion Merchandising	48%
Sales & Marketing	59

MINOR PROGRAMS	
Advertising	49%
Financial Credit Management	78
Floral Sales	58
Supermarket Management	69
Small Business Management	33
Hardware & Bldg. Materials Marketing	64
Interior Design	53
Hotel-Motel Supervision	100*
Professional Sales	36
Vending Repair & Merchandising	42
International Trade Specialist	65
Service Station Occupations	83*
Real Estate Sales	29
Arena Management	82
Recreational Sporting Goods Sales	36
Travel Planner	66
Distribution, Transportation & Mgmt.	59
Interior Environmental Specialist	N/A

HEALTH

MAJOR PROGRAMS	
Dental Assistant	69%
Medical Lab Assistant	77
Ward Clerk	54
Licensed Practical Nurse	77
Nurse's Aide	43

MINOR PROGRAMS	
Dental Lab Technician	51%
Human Services Assistant	48
Surgical Technician	72
Occupational Therapy Assistant	71
Orthotics/Prosthetics Assistant	70
Optometric Assistant	66
E.C.G. Technician	44
Inhalation Therapist	83
Medical Assistant	51
Central Services Technician	51
Paramedic	83
Pharmacy Technician	N/A

HOME ECONOMICS

MAJOR PROGRAMS	
Child Care Assistant	53%
Apparel Arts	36

MINOR PROGRAMS	
Housekeeping Aide	N/A
Food Service Manager	49%
Fashions, Fabrics & Notions	37
Dietetic Assistant	59
Delicatessen & Catering Special Foods	18

BUSINESS AND OFFICE

MAJOR PROGRAMS	
Accounting	60%
Bank Clerk	56
Practical Business Management	44
Data Entry	53
Data Processing II	77
Business & Office Clerk	62
Steno Clerk	50
General Secretary	66
Legal Secretary	56
Medical Secretary	63

MINOR PROGRAMS	
Bookkeeping	61%
Electronic Data Processing	85
Word Processing	58
Medical Clerical	39
Receptionist	44
Medical Records Technician	74
Purchasing & Inventory	38
Traffic Office Clerk	76
Educational Aide	51
Administrative Secretary	71
Court Reporter	71
Hospital Station Secretary	58
Rural Banking	57
Clerk Typist	49

TECHNICAL

MAJOR PROGRAMS	
Architectural Drafting	72%
Civil Highway Technician	70
Electronics Technician	83
Communications Technician	53
Fluid Power Technician	64

MINOR PROGRAMS	
Air Traffic Control	25%
Chemical Lab Technician	73
Cable Television Technician	82
Electro-Mechanical Technician	79
Environmental Technician	75
Industrial Energy Systems	70
Instrumentation Technician	69
Quality Control Technician	67
Industrial Technician	80
Tool Engineering & Design	81
Food Lab Management	48
Electro-Medical Technician	67
Avionics-Aviation Technician	89
Electronic Communications Technician	83
Powder Metal Technician	67

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TABLE 21
(CON'T)
1977 - 1979 CLOSELY RELATED PLACEMENT RATES BY PROGRAM AREA FOR PROGRAMS OPERATING IN FISCAL YEARS 1980 AND 1981

TRADE AND INDUSTRIAL

MAJOR PROGRAMS	
Air Conditioning & Heating	63%
Auto Body	55
Auto Mechanics	59
Parts Person	50
Commercial Art	58
Carpentry	70
Electrical	79
Plumbing	69
Maintenance Mechanic	71
Diesel & Truck Mechanic	76
Truck Driving	64
Mechanical Drafting	79
Graphic Arts	72
Machine Shop	73
Welding	59
Tool and Die	77
Cosmetology	59
Food Preparation	59
Small Engine Repair	42

MINOR PROGRAMS	
Energy Codes & Conservation	N/A
Appliance Repair	54%
Used Car Renovator	28
Aircraft Mechanics	59
Office Machine Service	74
Lettering and Design	45
Commercial Photography	52
Photographic Technician	60
Construction	68
Diesel & Truck Mechanic	60
Bricklaying	64
Painting and Decorating	75
Heavy Equipment Operation	47
Mobile Home Repair	12
Custodial & Building Maintenance	52
Architectural Drafting	77
Technical Drafting	64
Construction Drafting	80
Electrical Lines Person	86
Electric Motor Winding and Repair	76
Telephone Communications Technician	82
Audio-Visual Technician	49
Radio and Television Repair	64
Printing Offset	53
Optical Technician	64
Watchmaking	76
Production Machinist	68

MINOR PROGRAMS (CON'T)	
Sheet Metal	70%
Patternmaker	83
Gunsmithing	N/A
Jewelry Repair	82
Barbering	93
Plastic Injection Molding	48
Law Enforcement	69
Baking	45
Meat Cutting	68
Waiter/Waitress	N/A
Kitchen Assistant	42
Total Energy	38
Tailoring	39
Shoe Repair	50
Upholstery	52
Cabinet Making	64
Wood Finishing	57
Musical String Instrument Repair	45
Band Instrument Repair	67
Electronic Musical Instruments	64

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and the State Department of Education's Program Budget Reports.

*Less than ten students responded to the follow-up survey in these areas.

TABLE 22

PERCENTAGE OF PROGRAMS WITH RELATED PLACEMENT RATES OF 50 PERCENT OR LESS BY OCCUPATIONAL AREA: FISCAL YEAR 1977 - 1979 GRADUATES*

	Closely Related		Closely and Broadly Related	
	Unavailable Included	Unavailable Excluded	Unavailable Included	Unavailable Excluded
Agriculture	35%	35%	33%	33%
Distributive Education	40	34	31	28
Health	23	15	15	10
Home Economics	68	53	63	42
Business & Office	34	25	11	7
Technical	12	7	8	5
Trade & Industrial	25	20	6	3
AVTI System-wide Average	28%	22%	13%	10%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*Since data on the follow-up system define programs by an 8-digit code, this is the percentage of programs with 8-digit codes that have low related placement rates. Tables 23 and 24 also define programs by 8-digit codes.

TABLE 23

PERCENTAGE OF PROGRAMS WITH RELATED PLACEMENT RATES OF 50 PERCENT OR LESS BY OCCUPATIONAL AREA: FISCAL YEAR 1980 GRADUATES

	Closely Related		Closely and Broadly Related	
	Unavailable Included	Unavailable Excluded	Unavailable Included	Unavailable Excluded
Agriculture	51%	47%	31%	31%
Distributive Education	51	46	42	38
Health	26	17	21	12
Home Economics	65	55	60	50
Business & Office	44	33	24	13
Technical	37	36	34	30
Trade & Industrial	52	50	23	19
AVTI System-wide Average	47%	42%	27%	21%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

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TABLE 24

PERCENTAGE OF PROGRAMS WITH RELATED PLACEMENT RATES OF 50 PERCENT OR LESS BY OCCUPATIONAL AREA: FISCAL YEAR 1981 GRADUATES

	Closely Related		Closely and Broadly Related	
	Unavailable Included	Unavailable Excluded	Unavailable Included	Unavailable Excluded
Agriculture	33%	30%	30%	26%
Distributive Education	48	40	33	25
Health	18	8	13	5
Home Economics	68	53	63	53
Business & Office	40	34	22	16
Technical	39	38	36	34
Trade & Industrial	47	43	22	17
AVTI System-wide Average	42%	36%	25%	19%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

If graduates who say they are unavailable for employment are excluded, the percentage of low placement programs is 22 percent using the closely related placement measure and 10 percent with broadly related placements included.

Clearly, the 10 percent of AVTI programs that had low placement for all four measures have serious problems. The reasons for the low related employment of AVTI graduates vary by program. They include but are not limited to: (1) an excess statewide supply of workers in a particular occupation, (2) an insufficient local demand for a particular occupation, (3) inadequate training or equipment, (4) programs being taken for personal use rather than for acquiring marketable employment skills, and (5) schools or the State Department of Education paying inadequate attention to placement. It is important that these problems be immediately reviewed to determine the nature of the problem and that corrective action be taken. In some cases, this should mean the termination of programs.

Some of the other programs that have low closely related placement rates but rates higher than 50 percent when broadly related placements are included also have problems that merit close scrutiny. We found that a number of the programs with low closely related employment rates appear to be overly specialized. For example, some legal secretary and medical secretary programs place only a small percentage of their graduates in these specialized areas although the majority do get secretarial or clerical jobs. Since student/teacher ratios in the general secretary and clerical programs can be increased, fewer of the specialized programs should be offered. The students who would otherwise enroll in those programs could select one of the many general secretary or clerical courses offered throughout the state. Alternatively, schools could offer a core curriculum for general secretarial skills and offer students one or more short courses in these or other specialized areas. In either case, the AVTI system would be able to accomplish as much as before but with fewer resources.

The broadly related placement measure is also too generous for certain other programs, particularly those in the trade and industrial area. During the time period examined, too many diverse occupations were included in the trade and industrial area for the broadly related placement measure to be meaningful for trade and industrial graduates. Student opinion on job relatedness confirms that most of the trade and industrial jobs classified as broadly related are not related to the student's training.

Tables 23 and 24 show that the percentage of programs with related placement rates of 50 percent or less increased dramatically for fiscal year 1980 and 1981 graduates. Compared to 28 percent in the three prior years the percentage of programs with 50 percent or fewer graduates in closely related jobs one year after graduation was 47 percent for fiscal year 1980 and 42 percent for fiscal year 1981. The current economic recession is largely responsible for the increase. The technical and trade and industrial areas have been particularly affected. The AVTIs and the State Department of Education should *attempt to determine what occupations and programs are likely to be* permanently affected by changing economic conditions.

It should be pointed out that while the State Department of Education attempts to achieve an 80 percent overall response rate to the follow-up survey, it does not achieve that response rate for all programs. For some programs, the response rate is too low to provide a reliable estimate of the related placement rate.

We attempted to minimize this problem by using more than one year of data when calculating placement rates. Even with that approach, there are a few programs for which the response from graduates is too low. Nevertheless, the findings presented in this chapter do not appear to change significantly if we exclude those programs with a low response rate. This results because the percentage of programs with a low response level is small. Also, many of them have related placement rates higher than 50 percent according to the limited data available from the follow-up system. However, for those few programs affected, there is a need to acquire more data in order for the Department and the AVTIs to make informed budgetary and management decisions. An extra effort should be made to increase the response rate to the follow-up survey among graduates of these few programs. Alternatively, well-documented data collected by the AVTIs could be used to supplement the limited follow-up data.

There is no reason to believe that the placement problems discussed in this chapter are new or unique to Minnesota. In 1974, the General Accounting Office of the United States found that the states were not systematically evaluating vocational programs and were paying too little attention to placement rates.[5] In 1976, Congress passed legislation that sought to correct these deficiencies. A 1981 report issued by the United States Department of Education indicated that the states have not used placement data to revise program offerings as the 1976 amendments to the Vocational Education Act of 1963 intended.[6] While the report expressed pessimism about the usefulness of placement data, that pessimism appeared largely due to the fact that most other states have placement data of dubious quality and reliability. Compared to the 15 states the report covers, Minnesota's follow-up system appears to be far superior. In our opinion, Minnesota's system, unlike that of many other states, produces reliable placement data that can and should be used to revise program offerings.

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[5] Report of the Comptroller General of the United States, What is the Role of Federal Assistance for Vocational Education? (Washington, D.C.: U.S. General Accounting Office, 1974).

[6] The Vocational Education Study: The Final Report, National Institute of Education, U.S. Department of Education (Washington, D.C.), 1981.

D. PROPOSED CHANGES IN THE FOLLOW-UP SYSTEM

Because of the expense of operating the follow-up system, the Division of Vocational-Technical Education is planning to make some major changes over the next few years. The Division plans to have the survey administered locally by the AVTIs rather than by an independent consulting firm as presently is the case. In the past, the consultant was responsible for determining whether jobs were related to training. Under the proposed plans, it will not be possible to obtain objective data of this type. As a result, the Division plans to use student opinion on job relatedness to calculate related placement rates.

We are concerned about whether the proposed system will provide the objectively based data that the current system provides. In particular, we question whether student opinion is a valid indicator of related placement for all programs.

Because of the planned changes, we reviewed the relationship between student opinion and the measures of closely and broadly related placement. Our review included the fiscal year 1979 graduates of 11 AVTIs. Table 25 shows that nearly all jobs classified as closely related by the consultant were considered related by the students holding them. Only 30 percent of the broadly related and 12 percent of the unrelated jobs were considered related by students. Table 26 shows that, if these percentages are applied to all schools, related placement rates based on student opinion are slightly greater than closely related placement rates, but less than related placement rates that include broadly related placements.

These results are encouraging since they indicate student opinion might be a good overall proxy for the related placement measures currently used by the follow-up system. However, this does not mean student opinion is a valid measure for all programs. For example, graduates of a legal secretary program may consider a general secretarial job as related to their training. If this is the case, student opinion would mislead one into thinking that graduates of a specialized training program were getting jobs in these specialized areas. As a result, the system would continue to offer specialized programs even when they are not effective.

Consequently, before the Division of Vocational-Technical Education uses student opinion to measure relatedness, division staff should review past follow-up data to see whether student opinion presents a problem in specialized programs. In addition, if the Division uses student opinion in the future, they should validate the measure by comparing student opinion to an objective classification of jobs in a sample of programs.

TABLE 25

STUDENT OPINION ON JOB RELATEDNESS COMPARED TO THE FOLLOW-UP STUDY: FISCAL YEAR 1979 GRADUATES*

	Jobs Classified in the Follow-Up System as:											
	Closely Related			Broadly Related			Unrelated			No Job Code		
	Number of Jobs Students Say Are Related	Total Number of Jobs	Percent of Jobs Students Say Are Related	Number of Jobs Students Say Are Related	Total Number of Jobs	Percent of Jobs Students Say Are Related	Number of Jobs Students Say Are Related	Total Number of Jobs	Percent of Jobs Students Say Are Related	Number of Jobs Students Say Are Related	Total Number of Jobs	Percent of Jobs Students Say Are Related
Agriculture	138	139	99%	2	6	33%	5	38	13%	2	3	67%
Distributive Education	172	175	98	2	7	29	11	54	20	0	1	0
Health	541	545	99	11	19	58	8	72	11	2	4	50
Home Economics	50	50	100	1	1	100	2	25	8	0	2	0
Business and Office	627	648	97	45	96	47	10	101	10	4	7	57
Technical	250	250	100	0	2	0	4	52	8	0	1	0
Trade and Industrial	1,386	1,405	99	46	229	20	15	119	13	13	33	39
TOTALS	3,164	3,212	99%	107	360	30%	55	461	12%	21	51	41%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

*Based on an eleven school sample.

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TABLE 26

ESTIMATED DIFFERENCE BETWEEN STUDENT OPINION AND MEASURES OF JOB RELATEDNESS OBTAINED FROM THE FOLLOW-UP SYSTEM: FISCAL YEAR 1979 GRADUATES

	Related Placement Rates	
Placement Measures	Unavailable Graduates Included	Unavailable Graduates Excluded
Closely Related (per consultant)	62.4%	66.3%
Student Opinion (estimated)	64.4	68.1
Closely and Broadly Related (per consultant)	71.3	75.8

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System.

VI. WAGES

Another important objective of post-secondary vocational education is that AVTI graduates have better and more rewarding job opportunities than those attainable without a post-secondary education. This objective could be accomplished in a number of ways including: (1) AVTI programs may enable students to obtain higher paying jobs, (2) programs may reduce a student's chances of being unemployed, and (3) programs may improve a student's chances of obtaining promotions in the long run.

This chapter explores whether AVTI programs have produced these results. Because of the limitations of existing data, definitive conclusions cannot be reached. At best, the chapter raises some important questions about certain AVTI programs. The chapter compares the difference in wages earned by AVTI and high school graduates. It also briefly examines the difference in unemployment rates. The third area, that of long run promotability, cannot be addressed since there is no systematic follow-up of AVTI graduates more than one year after graduation.

On average, graduates of AVTI programs earn more one year after graduation than high school graduates do one year after graduation. The median hourly wage for AVTI students who completed training in fiscal year 1980 was $5.20 for metropolitan area schools and $4.66 for non-metropolitan area schools. The comparable figures for students who left high school during the same year and did not pursue further education were $4.69 and $4.13.[1] Table 27 lists the median wages for AVTI graduates in each of the AVTI's major program areas.

On average, AVTI graduates have tended to have a slightly lower unemployment rate than high school graduates one year after graduation. The amount of difference depends on how one treats

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[1] These figures do not include part-time employees who represent about 10 percent of the employed AVTI graduates and 12 percent of the employed high school comparison group. The high school group includes some students who did not graduate, although the percentage of non-graduates is only about 5 percent. The data on AVTI graduates only include those who obtained jobs related to their training.

The data on AVTI and high school graduates were obtained from the Minnesota Vocational Follow-Up System and the Minnesota Secondary School Follow-Up System. Strictly speaking, the wage rates given are estimates of the actual median wage rate. Data in both systems are reported by intervals. For example, the data show how many high school students earned between $3.00 and $3.99 per hour. An estimate of the median wage can be made if it is assumed that students' wages were evenly distributed within each interval.

TABLE 27

MEDIAN HOURLY WAGE RATES OF FISCAL YEAR 1980 GRADUATES FROM MAJOR AVTI PROGRAMS

	Median Wage Rate One Year After Graduation
Agriculture	
Agricultural Supplies and Services	$4.85
Farm Power Equipment Mechanic	4.73
Agricultural Production	4.04
Distributive Education	
Sales and Marketing	4.29
Fashion Merchandising	3.30
Health	
Licensed Practical Nurse	4.97
Medical Laboratory Assistant	4.94
Ward Clerk	4.37
Nurse's Aide	4.22
Dental Assistant	4.02
Home Economics	
Apparel Specialist	4.33
Child Care Assistant	3.20
Business and Office	
Data Processing II	6.22
Data Entry	4.55
Accounting	4.40
Practical Business Management	4.33
Legal Secretary	4.30
Medical Secretary	4.06
Bank Clerk	4.01
Business and Office Clerk	4.00
General Secretary	3.96
Stenographer/Clerk	3.75
Technical	
Fluid Power Technician	6.48
Electronics Technician	6.34
Civil Highway Technician	5.88
Architectural Drafting	5.59
Communications Technician	4.25
Trade and Industrial	
Plumbing	6.71
Tool and Die	6.54
Welding	6.20
Machine Shop	6.19
Mechanical Drafting	6.16
Maintenance Mechanic	5.84
Truck Driving	5.84
Diesel and Truck Mechanic	5.83
Carpentry	5.47
Air Conditioning & Heating	5.41
Electrical	5.37
Graphic Arts	5.37
Commercial Art	5.15
Auto Body	5.00
Food Preparation	4.96
Small Engine Repair	4.96
Auto Mechanics	4.92
Parts Person	4.37
Cosmetology	2.89

Source: Minnesota Vocational Follow-Up System.

those in the military when calculating the unemployment rate. Although few AVTI graduates were in the military one year after graduation, an estimated 3.8 percent of high school graduates from the class of 1980 were. If those in the military are excluded from the calculations, the 1981 unemployment rates for fiscal year 1980 graduates were 8.5 percent for the AVTIs and 10.2 percent for the high schools.[2] If those in the military are counted as being employed, the respective unemployment rates are 8.4 percent and 9.2 percent.

It is difficult for two reasons to isolate the effects of an AVTI education on future wage and unemployment rates. First, AVTI graduates have some advantages over our high school comparison group that should enable them to do better even without their AVTI training. The AVTI graduates are older and may have more work experience. Persons who enroll in an AVTI program soon after graduation from high school rank higher in their high school graduating class than our high school comparison group. Second, it is not known how the two groups fare in the long run. Some data on Minnesota high school graduates three years after graduation are available. However, there is no comparable follow-up of AVTI graduates.

Educational research studies tend to indicate that individuals with post-secondary vocational training generally earn more in the long run than general education high school graduates without a post-secondary education. A number of studies raise questions about whether this general conclusion applies equally to all post-secondary vocational programs. In Minnesota, the average AVTI graduate probably earns more than those who do not have a post-secondary education. However, this may not be true for graduates of certain AVTI programs.

We examined those AVTI programs whose graduates earned relatively low wages one year after graduation. These graduates were compared to high school graduates in similar occupations. One year after graduation there is no apparent difference in the wages earned by the two groups. Table 28 provides a few examples of AVTI programs for which little difference in wages earned one year after graduation is observed.

For some of the AVTI programs, the key issue is whether the AVTI graduates will fare better than high school graduates in the long run. For example, it is claimed that some graduates of AVTI programs in fashion merchandising earn $40,000 per year five years after graduation. Since everyone in the industry starts at the same wage, it is not surprising to some Division of Vocational-Technical Education staff that AVTI graduates' wages are not different from those of high school graduates when measured only one year after graduation. The issue is how many AVTI graduates achieve this level of success in the long run. Are these just isolated cases, or are most graduates employed in retail sales jobs such as those held by

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[2] Those continuing their education and those who are unavailable for employment were excluded in making these calculations.

TABLE 28

COMPARISON OF MEDIAN HOURLY WAGE RATES: FISCAL YEAR 1980 GRADUATES ONE YEAR AFTER GRADUATION

	Twin Cities Metropolitan Area Schools		Non-Metropolitan Schools	
	Median Wage	Number of Graduates Reporting Data	Median Wage	Number of Graduates Reporting Data
AVTI Sales Programs (predominantly female)				
Fashion Merchandising	$3.46	8	$3.27	37
Floral Sales	4.18	8	3.46	8
Advertising	--	--	3.27	4
High School Salespersons (female)	$3.79	66	$3.56	42
AVTI Parts Persons (predominantly male)	$4.47	7	$4.33	19
High School Salespersons	$4.44	53	$4.29	18
AVTI Child Care	$3.17	9	$3.23	17
High School Child Care	$3.59	7	$3.50	2

Source: Minnesota Vocational Follow-Up System and Minnesota Secondary School Follow-Up System.

high school graduates in the long run? Six of the nine fashion merchandising programs are outside the metropolitan Twin Cities area, although most opportunities in this field are probably within the Twin Cities area. Three of the six had closely related placement rates of 36 percent or less between 1977 and 1979. As a result, there is good reason to question whether the examples of success cited by division staff are typical of all of the nine programs. A limited long term follow-up of graduates of such programs is needed.

In addition to the programs listed in Table 28, there are other AVTI programs whose graduates appear to earn low wages. Among this group are a horse care and stable operations program, a livestock management program, and several horticultural aide programs. In some instances, an insufficient number of program graduates report information on their wages one year after graduation. Follow-up of those programs needs to be either more intensive or supplemented by data from other sources such as the AVTIs.

VII. MEASURES OF PROGRAM PERFORMANCE

Previous chapters have examined particular aspects of the efficiency and effectiveness of post-secondary vocational programs. Student/teacher ratios, related placement rates, dropout rates, and wages have been considered. This chapter presents certain composite measures of efficiency and effectiveness that combine two or more of these components of performance. In particular, we examine two cost measures (cost per completion and cost per closely related placement) and two productivity measures (completions per full-time licensed instructor and closely related placements per full-time licensed instructor). With the exception of the cost per completion measure, none of these measures have been used in the past by the State Department of Education.

The chapter also reviews data on several other performance measures that have been collected by the Minnesota Vocational Follow-Up System in the past. Specifically, measures of student satisfaction with vocational programs and instructors and employer satisfaction with AVTI graduates are presented.

Finally, this chapter reviews several other factors that should be considered in evaluating programs. These factors include the percentage of special needs students and the percentage of non-residents of Minnesota in the state's vocational programs.

A. COMPOSITE MEASURES OF EFFICIENCY AND EFFECTIVENESS

In previous chapters, we have identified the percentage of AVTI programs with one of the following problems: 1) a closely related employment rate of 50 percent or less one year after graduation, 2) a dropout rate of 50 percent or more, or 3) a student/teacher ratio under ten. The data previously presented are very useful for the purpose of illustrating the extent to which such problems occur. The data are also valuable for identifying those programs that have the worst student/teacher ratios, dropout rates, or related placement rates. However, in evaluating programs and making budget and management decisions, it is useful to have a composite measure that incorporates each of these components of performance. A composite measure would show, for example, that a program with a student/teacher ratio of 11, a dropout rate of 49 percent, and a related placement rate of 51 percent was a poorer performer than a program that had a 50 percent dropout rate but had a relatively high student/teacher ratio and excellent placement. The former program would not be identified as being among the worst performers in any of the three individual areas, but would likely have a much worse overall record.

The composite measures examined here are of two types: 1) cost and 2) productivity. The principal cost measure we use is the cost per closely related placement. This is defined as the amount of expenditures by a program divided by the estimated number of individuals that have jobs closely related to their training one year after leaving the AVTI. This measure incorporates the impact of the student/teacher ratio, the dropout rate, and the related placement rate. A second cost measure, cost per completion, only includes the impact of the first two factors.

The two productivity measures are: 1) closely related placements per full-time licensed instructor and 2) completions per full-time licensed instructor. Like the cost measures, the first of the productivity measures incorporates the effect of student/teacher ratios, dropout rates, and related placements. The second measure incorporates only the first two factors.

There are several advantages to using the productivity rather than the cost measures. First, the cost measures may reflect differences in teachers' salaries that one may not want to affect decisions about program offerings. The average teacher's salary varies from AVTI to AVTI because salaries are negotiated locally. Salaries also vary according to seniority. It might not be appropriate to single out a particular program at a school as a high cost program if the primary reason it costs more than similar programs at other AVTIs is because the instructor has greater seniority. Second, a program could be identified as having higher costs than similar programs because it made large equipment purchases in a given year. This might happen since equipment costs are expensed in the year of purchase and not depreciated over the life of the equipment in the program budgeting system. Finally, some programs would be identified as high cost programs simply because they have and are expected to have greater costs for equipment. One might expect this to be true of technical and some trade and industrial programs, for example.

Nevertheless, we have used cost measures as well as the productivity measures. Cost measures are particularly useful in showing the overall level of resources being expended for different types of programs. The cost measures also show that programs with high equipment costs are not necessarily the highest cost programs when costs are measured per related placement.

1. COST MEASURES

a. Methodology

Program costs are calculated two ways. One approach includes only the program's net budget in the State Department of Education's program budgeting system. The net budget is the program's direct costs less revenues received from the sales of services, products, or fixed assets by the program. For simplicity, the net budget is referred to as "direct costs" in this chapter. It should be recognized that the state's teacher retirement and social security contributions are not included in the net budget, since these costs are not paid from an appropriation to the Department or the AVTIs. They should, however, be considered direct costs. As a result, the measure we use understates direct costs.

The second approach includes direct program costs, state retirement and social security contributions, and administrative and overhead costs. Due to practical limitations, retirement and social security contributions were estimated to be 12 percent of the licensed salaries spent in each vocational program. Although the level of contributions may vary from teacher to teacher, it would be a monumental task to attempt to allocate these costs to individual programs in any other way. Administrative and overhead costs include those costs in the support services budget of the Department's program budget system. These costs were allocated to individual programs by assigning each program a share of its school's support services costs based on that program's share of the school's average daily membership (ADM). Ideally, one might like to assign these costs to programs in other ways. For example, heating costs might be assigned based on the space utilized by each program. Due to the limitations of existing data, the only practical means of allocating these costs to programs was by using program ADM.

For both approaches, two years of cost data are combined. Costs for fiscal years 1980 and 1981 are included. It should be noted that certain costs are not included in either approach. The costs of related or special needs instruction are not included. We also do not include debt service costs.

We use two different methods to measure completions and closely related placement rates for vocational programs. Method 1 uses the number of program completions reported in the Department's program budgets for fiscal years 1980 and 1981. Method 2 uses the number of program completions reported in the termination reports generated by the Minnesota Vocational Follow-Up System. Both methods include program graduates and individuals who AVTIs say acquired marketable skills though they did not complete a training program. Method 2 uses the closely related placement rates that programs actually had in fiscal years 1980 and 1981. Because of the economic recession, it may be appropriate to examine the rates experienced prior to 1980 and 1981. Consequently, in Method 1 we use the closely related placement rates that programs operating in fiscal years 1980 and 1981 experienced during the previous three-year period, fiscal years 1977-1979.

Of the two methods, AVTI programs fare better under Method 1. This results for two reasons. One is the higher placement rates experienced from fiscal year 1977 through 1979. The other reason is that the number of completions reported on program budgets is 4.4 percent higher than on termination reports for fiscal years 1980 and 1981. We suspect that the termination reports may be more accurate since they are based on individual reports that AVTIs file on each student leaving an AVTI. As a result, Method 1 may provide too generous an estimate of how well vocational programs are doing.

The analysis that follows relies more on Method 1 than on Method 2. For the reasons discussed above, the results we obtain may be a conservative estimate of the extent to which problems exist in the AVTI system. This is particularly true of results using the cost per completion or completions per instructor measures. For some programs, this may be offset by another factor when the cost per closely related placement or closely related placements per instructor measures are used. These placement measures may be too restrictive for some programs. For example, as we stated in Chapter V, a broadly related placement measure is more appropriate for general secretarial and clerical programs. In order to refine the composite measures developed here, it will be necessary for the State Department of Education to appropriately define what "related placement" means for particular programs.

b. Results

Tables 29 and 30 show the direct program costs and total costs per ADM, per completion, and per closely related placement for fiscal years 1980 and 1981 by occupational area. Total costs per ADM were $3,23? while direct costs per ADM were $1,922. Total costs per completion were $5,659 using Method 1 and $5,968 using Method 2. Total costs per closely related placement were $9,036 and $10,388 for the two methods. Direct costs per completion and per closely related placement are about 60 percent of the comparable total cost figures.

Using Method 1, technical and agricultural programs have the highest total costs per completion. Trade and industrial and distributive education programs also have higher than average costs. However, in terms of costs per closely related placement, agricultural and home economics programs are the most costly. Trade and industrial and technical programs are the next highest.

Tables 31 and 32 present data on the total costs per completion and total costs per closely related placement by individual program area using Method 1. The data show that there is a great variation among schools offering the same program. This indicates those schools at the high end of the cost range for a particular program are not as efficient or effective as the schools at the low end and that improvements are possible.[1] For program budget and management decisions, it may be better to consider only direct costs.

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[1] As we noted in Chapter V, the response rate to the follow-up survey was too low to provide a reliable estimate of the related placement rate for some individual programs. Although we minimized this problem by using more than one year of placement data, there are still some programs for which the response rate is low. There are several instances in Tables 31 and 32 in which a program with a low response rate has the highest cost per closely related placement among programs of its type. In some instances, we excluded these programs from the range presented in the tables. Others are included at the top of the range since the response rate to the fiscal year 1980 and 1981 follow-up surveys was adequate and indicates that these programs are still very costly. For example, the water well drilling program and the farm buildings and conveniences program with the highest cost on Table 32 are even more costly if 1980 and 1981 data are used. The highest cost programs in horse care, heavy equipment operation, and mobile home repair are less costly if the 1980 and 1981 data are used than indicated in the tables, but still cost more than $20,000 per closely related placement. Similar considerations were used in compiling Tables 37 and 38.

TABLE 29

DIRECT PROGRAM COSTS PER ADM, PER COMPLETION, AND PER CLOSELY RELATED PLACEMENT: FISCAL YEARS 1980 AND 1981

		Method 1			Method 2		
	Direct Costs	Cost per ADM	Cost per Completion	Cost per Closely Related Placement	Cost per ADM	Cost per Completion	Cost per Closely Related Placement
Agriculture	$ 7,586,410	$2,168	$4,447	$7,042	$2,168	$4,906	$8,738
Distributive Education	7,735,587	1,522	3,094	5,371	1,522	3,256	6,135
Health	11,747,756	2,043	1,938	3,161	2,043	2,052	3,109
Home Economics	2,249,987	2,205	3,082	6,609	2,205	3,200	7,746
Business & Office	21,393,479	1,745	2,806	4,526	1,745	2,900	4,677
Technical	11,577,770	1,809	4,404	5,814	1,809	4,597	7,295
Trade & Industrial	62,532,086	2,022	3,947	6,158	2,022	4,189	7,979
ALL PROGRAMS	$124,823,075	$1,922	$3,365	$5,370	$1,922	$3,550	$6,180

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

TABLE 30

TOTAL COSTS PER ADM, PER COMPLETION, AND PER CLOSELY RELATED PLACEMENT: FISCAL YEARS 1980 AND 1981

		Method 1			Method 2		
	Total Costs	Cost per ADM	Cost per Completion	Cost per Closely Related Placement	Cost per ADM	Cost per Completion	Cost per Closely Related Placement
Agriculture	$ 12,235,810	$3,497	$7,172	$11,476	$3,497	$7,902	$14,060
Distributive Education	14,152,529	2,785	5,661	9,865	2,785	5,964	11,238
Health	19,459,945	3,383	3,211	5,231	3,383	3,400	5,151
Home Economics	3,649,049	3,576	4,999	10,732	3,576	5,191	12,552
Business & Office	36,824,150	3,003	4,829	7,779	3,003	4,986	8,040
Technical	19,860,340	3,104	7,554	10,004	3,104	7,885	12,512
Trade & Industrial	103,739,368	3,354	6,548	10,210	3,354	6,949	13,234
ALL PROGRAMS	$209,921,191	$3,232	$5,659	$9,036	$3,232	$5,968	$10,388

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

TABLE 31

TOTAL COSTS PER COMPLETION AND PER CLOSELY RELATED PLACEMENT: MAJOR PROGRAMS OFFERED IN FISCAL YEARS 1980 AND 1981

	Total Cost per Completion (Method 1)		Total Cost per Closely Related Placement (Method 1)	
	Average	Range	Average	Range
Agriculture				
Agricultural Production	$ 8,475	$5,255-$31,543	$11,038	$ 8,342-$95,585
Agricultural Supplies & Services	7,244	5,528- 14,741	12,280	8,504- 26,802
Farm Power Equipment Mechanic	7,139	5,315- 13,455	9,647	6,644- 20,699
Distributive Education				
Fashion Merchandising	6,577	3,027- 8,148	13,790	9,852- 20,619
Sales and Marketing	5,290	1,828- 33,558	8,966	3,046-111,859
Health				
Dental Assistant	4,646	3,377- 6,449	6,733	4,502- 8,600
Medical Lab Assistant	6,308	4,552- 8,086	8,192	5,990- 11,077
Ward Clerk	993	474- 1,763	1,525	846- 3,326
Licensed Practical Nurse	4,487	3,388- 7,736	5,828	4,315- 9,209
Nurse's Aide	526	217- 779	1,229	395- 1,637
Home Economics				
Child Care Assistant	3,608	2,202- 4,175	6,807	3,191- 9,303
Apparel Arts	5,871	3,800- 8,126	16,309	12,213- 47,502
Business and Office				
Accounting	5,857	3,187- 11,102	9,762	3,996- 22,829
Bank Clerk	3,914	2,868- 5,365	6,583	6,828- 13,065
Practical Business Management	4,606	3,556- 6,646	9,509	7,878- 9,480
Data Entry	2,202	842- 5,637	4,155	1,560- 14,834
Data Processing II	10,846	8,686- 19,632	14,085	9,706- 24,237
Business and Office Clerk	3,918	2,367- 7,521	6,320	4,019- 12,628
Stenographer/Clerk	5,642	3,974- 10,365	11,285	6,734- 20,730
General Secretary	4,242	2,403- 17,274	6,390	3,238- 26,576
Legal Secretary	3,501	2,439- 9,222	6,142	2,975- 22,268
Medical Secretary	3,935	2,525- 11,072	6,246	4,281- 13,502
Technical				
Architectural Drafting	8,414	4,496- 15,666	11,686	8,780- 23,383
Civil Highway Technician	6,555	3,597- 13,696	9,365	6,918- 17,559
Electronics Technician	7,336	4,461- 12,540	8,838	5,187- 15,255
Communications Technician	6,837	4,790- 10,794	12,901	6,473- 20,412
Fluid Power Technician	7,659	2,947- 19,644	11,967	6,270- 20,222
Trade and Industrial				
Air Conditioning & Heating	5,735	2,582- 12,170	9,104	5,514- 14,488
Auto Body	7,811	4,185- 15,914	14,202	8,047- 31,829
Auto Mechanics	9,262	3,705- 26,550	15,698	7,411- 55,822
Parts Person	5,444	2,872- 9,972	10,888	5,129- 25,221
Commercial Art	6,802	3,381- 8,433	11,728	5,288- 18,838
Carpentry	6,941	2,809- 11,338	9,859	4,260- 25,251
Electrical	6,944	4,386- 11,028	8,674	6,008- 13,287
Plumbing	3,518	2,496- 10,455	4,647	3,105- 6,875
Maintenance Mechanics	6,001	4,583- 8,332	8,506	4,928- 17,497
Diesel and Truck Mechanics	6,489	4,492- 14,372	8,286	5,477- 22,699
Truck Driving	4,724	2,855- 7,736	7,381	5,294- 10,315
Mechanical Drafting	6,955	3,944- 12,972	8,804	4,992- 14,323
Graphic Arts	6,662	4,360- 13,837	9,253	6,228- 15,904
Machine Shop	8,514	4,592- 25,931	11,663	7,018- 32,414
Welding	5,982	3,170- 12,740	10,139	4,684- 25,535
Tool and Die	7,162	3,097- 14,645	9,301	5,407- 19,270
Cosmetology	3,340	972- 5,022	5,787	3,606- 9,476
Food Preparation	6,608	3,920- 11,797	11,201	5,818- 19,662
Small Engine Repair	5,562	3,271- 7,653	13,243	9,384- 19,571

Source: Program Evaluation Division analysis of data obtained from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

TABLE 32

TOTAL COSTS PER COMPLETION AND PER CLOSELY RELATED PLACEMENT: MINOR PROGRAMS OFFERED IN FISCAL YEARS 1980 AND 1981

	Total Cost per Completion (Method 1)		Total Cost per Closely Related Placement (Method 1)	
	Average	Range*	Average	Range*
Agriculture				
Livestock/Horse Care	$ 5,971	$5,196- $ 6,575	$19,262	$ 8,957-$93,931
Farm Management	8,972	5,197- 14,397	21,258	21,146- 21,370
Farrier	3,799	--	11,513	--
Water Well Drilling	12,557	--	25,115	--
Farm Building & Conveniences	9,796	8,318- 13,138	17,811	13,138- 33,271
Horticulture Aide	4,458	3,165- 5,747	10,132	6,594- 14,016
Specialty Crop Production	13,658	--	**	--
Floral Production	9,142	--	21,767	--
Landscape Technician	6,777	3,474- 10,277	11,889	6,203- 17,629
Natural Resources Technician	3,778	3,038- 9,067	4,748	--
Land Construction Conservation	3,137	--	4,022	--
Forest Harvest Technician	7,802	5,171- 10,856	17,832	--
Distributive Education				
Advertising	5,784	5,054- 7,700	11,883	10,167- 15,793
Financial Credit Management	10,318	6,962- 35,488	13,228	8,002- 59,146
Floral Sales	3,209	3,068- 3,443	5,532	5,297- 6,016
Supermarket Management	9,304	7,720- 10,602	13,484	9,773- 15,592
Small Business Management	3,797	--	11,505	--
Hardware Bldg. Materials Marketing	7,732	6,737- 9,498	12,081	10,526- 17,042
Interior Design	7,838	3,570- 10,279	14,788	10,044- 19,767
Hotel-Motel Supervision	6,633	--	6,633	--
Professional Sales	4,575	3,292- 7,704	12,565	7,316- 59,261
Vending Repair & Merchandising	5,162	3,445- 17,179	8,203	--
International Trade Specialist	3,128	--	4,813	--
Service Station Occupations	11,336	--	13,657	--
Real Estate Sales	1,639	--	5,651	--
Arena Management	8,380	--	10,219	--
Recreational Sporting Goods Sales	4,392	4,254- 4,661	11,816	--
Travel Planner	3,792	--	5,745	--
Distribution, Transportation and Management	4,438	3,212- 6,182	8,675	7,647- 9,091
Health				
Dental Lab Technician	8,500	8,234- 8,834	16,667	15,774- 19,604
Human Services Assistant	2,522	1,638- 3,621	5,322	3,748- 6,466
Surgical Technician	4,414	2,916- 10,145	6,131	4,557- 12,524
Occupational Therapy Assistant	3,428	2,635- 4,745	4,828	3,659- 6,876
Orthotics/Prosthetics Assistant	9,100	--	13,001	--
Optometric Assistant	3,732	3,674- 3,847	5,655	5,209- 5,741
E.C.G. Technician	7,364	--	16,737	--
Inhalation Therapist	6,277	4,380- 8,379	7,563	5,341- 9,743
Medical Assistant	5,579	2,878- 9,129	10,939	5,535- 18,631
Central Services Technician	2,478	--	4,858	--
Paramedic	4,155	--	5,006	--
Pharmacy Technician	3,342	--	N/A	--
Home Economics				
Housekeeping Aide	6,265	--	N/A	--
Food Service Manager	12,093	4,703- 21,636	24,680	11,198- 39,338
Fashions, Fabrics and Notions	5,804	5,448- 6,072	15,688	14,457- 21,792
Dietetic Assistant	4,010	253- 7,158	7,209	--
Delicatessen & Catering Special Foods	9,671	--	53,725	--
Business and Office				
Bookkeeping	4,301	3,174- 6,334	7,096	5,119- 10,507
Electronic Data Processing	6,656	4,900- 10,474	7,830	5,600- 10,474
Word Processing	6,158	4,927- 9,113	10,618	8,799- 13,602
Medical Clerical	3,584	--	9,191	--
Receptionist	1,462	934- 3,774	3,322	2,396- 6,290
Medical Records Technician	3,452	3,295- 3,743	4,453	--
Purchasing and Inventory	4,345	--	11,434	--
Traffic Office Clerk	4,841	--	8,965	--
Educational Aide	3,316	2,516- 3,876	6,502	5,718- 7,177
Administrative Secretary	3,296	--	4,642	--
Court Reporter	9,999	9,344- 11,373	14,082	10,865- 39,217
Rural Banking	6,194	5,852- 6,706	10,866	10,641- 11,366
Clerk Typist	9,294	--	18,967	--

TABLE 32 (CON'T)

	Average	Range*	Average	Range*
Technical				
Air Traffic Control	$ 4,744	--	$18,976	--
Chemical Lab Technician	5,178	$3,699-$ 5,988	7,254	$ 7,114-$ 7,302
Cable Television Technician	11,894	9,193- 13,244	14,505	12,594- 15,223
Electro-Mechanical Technician	6,099	3,820- 10,534	7,720	5,305- 15,454
Environmental Technician	7,260	6,373- 9,138	9,680	8,976- 10,042
Industrial Energy Systems	8,428	7,022- 9,825	12,040	9,890- 19,651
Instrumentation Technician	7,442	7,299- 7,620	10,786	10,160- 11,586
Quality Control Technician	8,135	7,906- 8,812	13,152	--
Industrial Technician	9,628	6,643- 10,312	12,035	10,380- 12,575
Tool Engineering and Design	10,141	--	12,520	--
Food Lab Management	10,661	6,937- 45,410	14,453	--
Electro-Medical Technician	7,560	6,566- 9,863	14,721	--
Avionics/Aviation Technician	10,645	--	11,961	--
Electronic Communications Technician	7,749	--	9,337	--
Powder Metal Technician	10,434	--	15,573	--
Trade and Industrial				
Energy Codes & Conservation	8,053	--	N/A	--
Appliance Repair	5,507	2,494- 9,979	10,198	4,987- 20,050
Used Care Renovator	5,271	--	18,824	--
Aircraft Mechanics	8,770	7,283- 28,427	14,864	13,443- 39,482
Office Machine Service Person	6,958	2,482- 11,792	9,403	3,818- 10,154
Lettering and Design	3,725	--	8,277	--
Commercial Photography	7,903	7,689- 8,391	15,197	13,318- 17,476
Photographic Technician	10,200	7,216- 17,316	17,000	15,353- 23,720
Construction	7,592	6,279- 8,906	11,165	9,235- 19,159
Diesel & Truck Mechanics	10,559	6,606- 26,917	17,598	11,390- 48,939
Bricklaying	4,812	4,477- 4,936	7,519	6,218- 7,962
Painting and Decorating	5,081	4,034- 5,930	6,774	5,308- 7,907
Heavy Equipment Operation	9,368	6,044- 10,040	20,941	11,685- 59,060
Mobile Home Repair	5,674	2,968- 9,327	47,284	21,203-116,584
Custodial & Building Maintenance	6,313	4,607- 6,646	12,141	6,876- 26,586
Architectural Drafting	6,496	5,967- 6,992	8,436	7,276- 10,526
Technical Drafting	6,376	--	9,962	--
Construction Drafting	6,669	5,732- 7,398	8,133	5,732- 8,668
Electrical Lines Person	5,185	4,074- 5,891	6,029	4,850- 7,013
Electric Motor Winding & Repair	4,236	--	5,574	--
Telephone Communications Technician	5,001	3,721- 6,033	6,099	4,771- 7,268
Audio-Visual Technician	11,153	7,666- 19,417	22,761	17,423- 41,087
Radio & Television Repair	5,316	3,855- 8,604	8,306	5,669- 13,878
Printing Offset	3,249	--	6,130	--
Optical Technician	4,019	3,922- 4,274	6,279	6,225- 6,379
Watchmaking	3,289	--	4,328	--
Production Machinist	5,593	3,631- 10,120	8,226	6,051- 13,122
Sheet Metal	5,085	2,942- 13,429	7,265	3,923- 16,180
Patternmaker	11,780	--	14,192	--
Jewelry Repair	6,460	--	7,878	--
Barbering	5,256	--	5,651	--
Plastic Injection Molding	7,309	4,956- 8,040	14,180	9,912- 17,106
Law Enforcement	6,872	4,197- 8,796	9,959	6,881- 10,228
Baking	5,143	4,146- 6,317	11,429	7,677- 21,543
Meat Cutting	4,291	3,736- 5,453	6,310	5,494- 8,020
Waiter/Waitress	5,456	--	N/A	--
Kitchen Assistant	2,324	2,213- 2,404	5,534	5,399- 5,463
Total Energy	3,998	--	10,521	--
Tailoring	6,579	4,022- 9,833	16,868	8,556- 31,719
Shoe Repair	4,897	--	9,793	--
Upholstery	7,068	6,414- 9,685	13,593	11,253- 33,396
Cabinet Making	6,430	5,082- 7,646	10,047	7,459- 12,332
Wood Finishing	7,786	--	13,660	--
Musical String Instrument Repair	3,129	--	6,953	--
Band Instrument Repair	3,251	--	4,852	--
Electronic Musical Instrument	4,252	--	6,643	--

Source: Program Evaluation Division analysis of data obtained from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

*No range for costs per completion or per placement is listed if there was only one program of a particular type or if there were placement data for only one program. "N/A" indicates that none of the programs of this type had placement data.

**At the school offering this progam only one student responded to the follow-up survey. That student did not have a closely related job.

Total costs are shown in Tables 31 and 32 because they provide the best indicator of the overall level of resources expended. However, since administrative and overhead costs vary from school to school, a direct cost measure would be better for comparative purposes. The direct cost figures also show a large variation among schools operating the same program.

In comparing programs, there is also a need to consider program length. Programs taking two school years to complete cost more per completion and per closely related placement than programs lasting one school year. Tables 33 and 34 summarize the cost data previously presented while illustrating the effect of program length on cost. The data also indicate that a significant number of programs have extremely high costs.

Using Method 1, we find that 14 percent of all programs lasting 15 to 24 months had a total cost per closely related placement of $20,000 or more. Twelve percent of the programs with lengths of 6 to 14 months cost $15,000 or more per closely related placement. The results are even more startling if Method 2 is used. Twenty-six percent of the longer programs exceeded $20,000 and 24 percent of the shorter programs exceeded $15,000.

The cost data developed here can also be used to compare the cost of programs to the wages earned by AVTI graduates one year after graduation. Such a comparison gives some idea of how the benefits of training compare to the costs. Table 35 compares the estimated median annual earnings of major program graduates to the total cost per closely related placement. Among programs averaging 15 to 24 months in length, fashion merchandising graduates have the lowest wages relative to the cost of their training. Auto mechanics, auto body, agricultural production, and agricultural supplies and services programs also have low wages relative to costs. Among programs averaging between 6 and 14 months in length, wages are low relative to costs for graduates of the following programs: apparel specialist, communications technician, stenographer/clerk, small engine repair, and parts person.

2. PRODUCTIVITY MEASURES

As we pointed out earlier, productivity measures have certain advantages over cost measures when used to evaluate programs. Consequently, data on completions and closely related placements per full-time (FTE) licensed instructor are presented in this section. Although these data can help one make better decisions about program offerings than the cost data, our conclusions remain the same. There are considerable differences in productivity among schools offering the same program. A significant percentage of programs have had an extremely low number of completions or closely related placements per instructor. Consequently, improvement is both possible and necessary.

TABLE 33

TOTAL COST PER CLOSELY RELATED PLACEMENT: PROGRAMS OF 15 TO 24 MONTHS IN LENGTH

	Median Cost	$0-4,999	$5,000-9,999	$10,000-14,999	$15,000-19,999	$20,000 or More
Method 1*	$11,800	2%	32%	34%	17%	14%
Method 2	14,200	1	18	36	19	26

TABLE 34

TOTAL COST PER CLOSELY RELATED PLACEMENT: PROGRAMS OF 6 TO 14 MONTHS IN LENGTH

	Median Cost	$0-4,999	$5,000-9,999	$10,000-14,999	$15,000-19,999	$20,000 or More
Method 1*	$7,800	14%	54%	21%	6%	6%
Method 2	9,500	11	42	23	10	14

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

*Totals do not add to 100% due to rounding.

TABLE 35

COMPARISON OF MEDIAN ANNUAL EARNINGS TO COST PER CLOSELY RELATED PLACEMENT FOR MAJOR PROGRAM GRADUATES

	Estimated Median Annual Earnings*	Total Cost per Closely Related Placement (Method 1)	Annual Earnings as a Percentage of Cost per Placement For:		
			Programs of 15-24 Months in Length	Programs of 6-14 Months in Length	Programs Lasting Less than 6 Months
Agriculture					
Agricultural Supplies/Services	$10,088	$12,280	82%		
Farm Power Equipment Mechanic	9,838	9,647	102		
Agricultural Production	8,403	11,038	76		
Distributive Education					
Sales and Marketing	8,923	8,966	100		
Fashion Merchandising	6,864	13,790	50		
Health					
Licensed Practical Nurse	10,338	5,828		177%	
Medical Lab Assistant	10,275	8,192	125		
Ward Clerk	9,090	1,525			596%
Nurse's Aide	8,778	1,229			714
Dental Assistant	8,361	6,733		124	
Home Economics					
Apparel Specialist	9,006	16,309		55	
Child Care Assistant	6,656	6,807		98	
Business and Office					
Data Processing II	12,938	14,085	92		
Data Entry	9,464	4,155			228
Accounting	9,152	9,762	94		
Practical Business Management	9,006	9,509		95	
Legal Secretary	8,944	6,142		146	
Medical Secretary	8,445	6,246		135	
Bank Clerk	8,341	6,583		127	
Business and Office Clerk	8,320	6,321		132	
General Secretary	8,237	6,390		129	
Stenographer/Clerk	7,800	11,285		69	
Technical					
Fluid Power Technician	13,478	11,967	113		
Electronics Technician	13,187	8,838	149		
Civil Highway Technician	12,230	9,365	131		
Architectural Drafting	11,627	11,686	99		
Communications Technician	8,840	12,801		69	
Trade and Industrial					
Plumbing	13,957	4,647		300	
Tool and Die	13,603	9,301	146		
Welding	12,896	10,153		127	
Machine Shop	12,875	11,663	110		
Mechanical Drafting	12,813	8,804	146		
Maintenance Mechanics	12,147	8,506	143		
Truck Driving	12,147	7,381		165	
Diesel and Truck Mechanics	12,126	8,286	146		
Carpentry	11,378	9,907	115		
Air Conditioning and Heating	11,253	9,104	124		
Electrical	11,170	8,674	129		
Graphic Arts	11,170	10,509		106	
Commercial Art	10,712	11,728	91		
Auto Body	10,400	14,155	73		
Food Preparation	10,317	11,202		92	
Small Engine Repair	10,317	13,243		78	
Auto Mechanics	10,234	15,698	65		
Parts Person	9,090	10,886		83	
Cosmetology	6,011	5,787		104	

Source: Earnings data are from the Minnesota Vocational Follow-Up System.

*Median annual earnings assume full-time employment (2,080 hours per year) and represent salaries of fiscal 1980 graduates one year after graduation.

Table 36 shows the completions and closely related placements for fiscal years 1980 and 1981 by occupational categories. These data are presented using both Method 1 and Method 2. Tables 37 and 38 show the averages and ranges for particular programs using Method 1.

The severity of the problem can be best illustrated by focusing on programs with low ratios of completions or placements per instructor. Table 39 shows that 19 percent of vocational programs for which data were available had fewer than five completions per instructor per year. Table 40 shows that 20 percent of vocational programs for which data were available had fewer than three closely related placements per instructor per year. These data were calculated using Method 1.

As with cost measures, there is a need to differentiate by program length. Longer programs generally have fewer completions and closely related placements per full-time instructor. Table 41 shows that 15 percent of the programs lasting 15 to 24 months had fewer than four completions per instructor per year. Twenty-eight percent of the programs had fewer than three closely related placements per instructor per year.

Shorter programs should be expected to have more completions and placements per instructor on average. Table 42 shows that 27 percent of the programs taking 6 to 14 months to complete had fewer than eight completions per instructor (six completions per instructor for health programs). Forty-two percent of the programs had fewer than five closely related placements per instructor (four closely related placements per instructor for health programs).

Overall, 21 percent of the programs have a low completions per instructor ratio. Thirty-five percent have a low closely related placements per instructor ratio. These data are presented in Table 43.

The closely related placements per instructor and cost per closely related placement measures that have been presented in this chapter are extremely useful measures for evaluating and comparing programs. It should be recognized, however, that a program can provide benefits to a student even if the student does not get a closely related job. A graduate of a legal secretary program has clearly benefited from the program even if the graduate has a general secretarial (non-legal) job. A graduate of a mobile home construction and repair program will use some of the skills acquired during training if that graduate has a job in one of the construction trades even though the job does not involve mobile homes.

Some students who obtain jobs unrelated to their training may also benefit from their training. For example, a displaced homemaker who acquires interview and job skills but obtains an unrelated job has benefited.

TABLE 36

COMPLETIONS PER INSTRUCTOR AND CLOSELY RELATED PLACEMENTS PER INSTRUCTOR: FISCAL YEARS 1980 AND 1981

	Method 1*		Method 2	
	Completions per FTE Licensed Instructor	Closely Related Placements per FTE Licensed Instructor	Completions per FTE Licensed Instructor	Closely Related Placements per FTE Licensed Instructor
Agriculture	6.2	3.8	5.7	3.2
Distributive Education	7.2	4.1	6.9	3.6
Health	11.2	7.3	10.6	7.0
Home Economics	8.9	4.2	8.6	3.6
Business and Office	9.5	5.9	9.2	5.7
Technical	6.3	4.7	6.1	3.8
Trade and Industrial	7.6	4.9	7.2	3.8
AVTI SYSTEM AVERAGES	8.2	5.1	7.8	4.5

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

*Method 1 uses placement data from 1977-1979 and completion data from program budget reports. Method 2 uses actual placement rates for 1980 and 1981 and completion data from the follow-up system.

TABLE 37

AVERAGE NUMBERS OF COMPLETIONS AND PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR: MAJOR PROGRAMS OFFERED IN FISCAL YEARS 1980 AND 1981 (METHOD 1)

	Number of Programs Offered	Median Length in Months	Completions per Licensed FTE Instructor	Range of Completions per Instructor*	Closely Related Placements per Licensed FTE Instructor	Range of Closely Related Placements per Instructor*
Agriculture						
Agricultural Production	10	19	4.64	1.56- 8.10	3.58	0.52- 5.10
Agricultural Supplies/Services	7	18	5.57	2.50- 9.60	3.29	1.38- 6.24
Farm Power Equipment Mechanic	6	18	6.59	3.18- 8.98	4.88	2.07- 6.62
Distributive Education						
Fashion Merchandising	9	18	5.44	3.52-11.15	2.61	1.76- 4.05
Sales and Marketing	17	19	7.67	1.15-14.48	4.52	0.35- 8.69
Health						
Dental Assistant	9	11	8.44	6.38-12.13	5.83	4.86- 9.10
Medical Lab Assistant	6	18	5.92	4.38- 9.39	4.56	3.19- 7.13
Ward Clerk	7	4	38.68	17.69-70.00	24.05	14.13-33.21
Licensed Practical Nurse	21	10	7.79	3.61-10.96	6.00	3.03- 8.38
Nurse's Aide	11	1	56.08	30.56-12[illegible].67	24.06	13.75-62.15
Home Economics						
Child Care Assistant	5	9	11.92	10.00-16.53	6.32	4.25-11.41
Apparel Arts	5	14	6.35	4.91-11.00	2.29	0.88- 2.53
Business and Office						
Accounting	27	18	7.52	4.40-14.17	4.51	2.10- 9.83
Bank Clerk	5	10	10.66	7.59-14.48	5.19	2.58- 6.08
Practical Business Management	5	10	8.82	4.79-18.46	4.70	3.66- 7.75
Data Entry	5	3	22.67	9.02-57.00	12.02	3.43-30.78
Data Processing II	8	20	5.58	2.56- 8.82	4.29	2.05- 5.92
Business and Office Clerk	20	9	11.50	4.48-23.85	7.13	3.25-11.92
Stenographer/Clerk	5	9	6.99	5.10- 8.57	3.49	3.20- 5.10
General Secretary	24	9	10.44	2.82-18.25	6.93	1.83-14.05
Legal Secretary	15	10	12.07	6.15-25.83	6.88	2.21-17.31
Medical Secretary	16	10	10.59	3.87-24.58	6.67	2.36-14.26
Technical						
Architectural Drafting	8	20	5.29	2.71- 8.46	3.81	1.81- 6.18
Civil Highway Technician	7	17	6.62	2.58-12.92	4.64	2.02- 6.72
Electronics Technician	17	18	6.24	3.85-12.17	5.18	2.81-10.46
Communications Technician	5	13	7.49	5.43-10.00	3.97	2.39- 7.40
Fluid Power Technician	5	18	7.10	2.50-16.33	4.54	2.50- 7.68
Trade and Industrial						
Air Conditioning & Heating	7	18	8.53	5.83-18.10	5.37	2.98-11.83
Auto Body	17	18	6.50	4.26-10.88	3.57	2.13- 5.75
Auto Mechanics	28	18	4.92	1.48-12.81	2.90	0.83- 6.41
Parts Person	14	10	7.67	4.23-18.80	3.83	1.45-10.83
Commercial Art	7	18	7.29	6.17-13.04	4.23	2.77- 7.70
Carpentry	17	18	6.80	3.94-18.75	4.82	1.44-11.63
Electrical	13	19	6.23	3.53-10.50	5.08	3.41- 8.51
Plumbing	5	9	12.33	3.13-18.10	9.80	6.10-14.23
Maintenance Mechanics	6	18	7.38	4.62-10.77	5.32	2.64-10.02
Diesel & Truck Mechanics	13	18	7.65	3.70-11.96	5.98	1.85- 9.23
Truck Driving	5	6	14.66	8.08-24.50	9.38	6.06-15.44
Mechanical Drafting	14	18	6.35	3.80-11.88	5.02	2.71- 9.38
Graphic Arts	10	14	9.24	5.81-12.61	6.65	3.78- 8.83
Machine Shop	13	18	6.69	1.94-18.82	4.88	1.55-11.48
Welding	25	10	8.44	4.21-16.04	4.98	1.93-11.64
Tool and Die	8	18	7.40	3.27-14.35	5.70	2.48-10.77
Cosmetology	9	12	10.30	6.63-15.25	5.89	3.75- 9.76
Food Preparation	14	12	7.67	3.64-11.08	4.53	2.20- 7.65
Small Engine Repair	9	12	8.86	6.42-12.94	3.72	2.37- 5.71

Source: Data on completions and licensed instructors were obtained from SDE Program Budget Reports. Placement data were obtained from the Minnesota Vocational Follow-Up System.

TABLE 38

AVERAGE NUMBERS OF COMPLETIONS AND PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR: MINOR PROGRAMS OFFERED IN FISCAL YEARS 1980 AND 1981 (METHOD 1)

	Number of Programs Offered	Length in Months	Completions per Licensed FTE Instructor	Range of Completions per Instructor*	Closely Related Placements per Licensed FTE Instructor	Range of Closely Related Placements per Instructor*
Agriculture						
Livestock/Horse Care	2	3-11	11.43	10.77-12.00	3.54	0.84- 6.25
Farm Management	4	8-22	4.41	3.08- 8.89	1.79	1.46- 2.09
Farrier	1	10	10.00	--	3.30	--
Water Well Drilling	1	18	6.92	--	3.46	--
Farm Building & Conveniences	3	9-22	4.48	3.77- 6.15	2.46	1.54- 4.00
Horticulture Aide	3	9-12	11.41	8.95-17.50	5.02	3.74- 8.40
Specialty Crop Production	1	20-24	9.27	--	**	--
Floral Production	1	3-14	6.13	--	2.57	--
Landscape Technician	4	3-22	6.98	4.01-12.87	3.98	2.73- 7.21
Natural Resources Technician	2	21	11.91	4.06-16.32	10.44	--
Land Construction Conservation	1	11	8.46	--	6.60	--
Forest Harvest Technician	2	10-11	6.86	4.06- 8.19	2.38	--
Distributive Education						
Advertising	4	10-22	7.18	5.38- 9.62	[illegible].68	2.69- 4.27
Financial Credit Management	2	19-22	3.43	0.82- 6.00	2.68	0.49- 5.22
Floral Sales	2	10	17.57	16.43-13.33	10.19	9.35-10.68
Supermarket Management	3	11-22	4.67	4.17- 4.81	3.22	3.21- 3.29
Small Business Management	1	9	11.79	--	3.39	--
Hardware Bldg. Materials Mkt.	3	10-22	5.50	4.58- 6.35	3.52	2.43- 4.06
Interior Design	4	9-22	6.15	5.62-10.37	3.26	2.92- 3.77
Hotel-Motel Supervision	1	20	6.46	--	6.46	--
Professional Sales	3	10	8.16	4.62-14.09	3.22	0.60- 6.34
Vending Repair & Merchandising	2	12-21	7.36	2.22-10.98	4.61	--
International Trade Specialist	1	11	11.43	--	7.43	--
Service Station Occupations	1	9	2.67	--	2.21	--
Real Estate Sales	1	6	20.00	--	5.80	--
Arena Management	1	11-22	4.14	--	3.39	--
Recreational Sport. Goods Sales	2	11-12	9.03	8.46- 9.35	3.37	--
Travel Planner	1	8	16.71	--	11.03	--
Distribution, Transp. & Mgmt.	2	1-20	8.95	6.36-12.31	5.06	4.33- 5.17
Health						
Dental Lab Technician	2	20	5.33	5.26- 5.38	2.72	2.26- 2.95
Human Services Assistant	4	4-10	13.68	11.54-17.56	6.62	6.46- 7.76
Surgical Technician	4	9-10	7.15	2.44-13.14	5.15	1.98- 8.41
Occupational Therapy Assistant	2	18	9.92	7.12-13.00	7.04	4.91- 9.36
Orthotics/Prosthetics Assistant	1	6-12	5.05	--	3.53	--
Optometric Assistant	2	9-10	15.26	14.29-15.83	10.24	10.13-10.43
E.C.G. Technician	1	12-18	4.40	--	1.92	--
Inhalation Therapist	2	11-22	4.51	3.16- 7.32	3.74	2.72- 6.00
Medical Assistant	4	9-16	7.58	5.63-15.22	3.87	2.02- 7.91
Central Services Technician	1	6	15.48	--	7.89	--
Paramedic	1	8	10.00	--	8.30	--
Pharmacy Technician	1	5	9.58	--	N/A	--
Home Economics						
Housekeeping Aide	1	9	5.77	--	N/A	--
Food Service Manager	3	10-22	5.23	3.54- 8.33	2.56	1.94- 3.41
Fashions, Fabrics & Notions	2	9	6.00	--	2.22	1.50- 2.52
Dietetic Assistant	3	12-24	11.30	8.08-100.00	5.32	--
Delicatessen & Catering Special Foods	1	18	3.75	--	0.68	--
Business and Office						
Bookkeeping	3	6- 9	8.97	4.48-15.42	5.53	3.05- 9.56
Electronic Data Processing and Programming	4	11-22	10.21	6.25-14.60	8.68	5.56-13.14
Word Processing	2	9-10	10.00	6.00-13.85	5.80	4.02- 7.75
Medical Clerical	1	9	10.00	--	3.90	--
Receptionist	2	3-11	20.59	9.29-28.50	9.06	5.57-11.12
Medical Records Technician	2	20	8.51	8.41- 8.70	6.22	--
Purchasing and Inventory	1	10	10.00	--	3.80	--
Traffic Office Clerk	1	13	8.67	--	4.68	--
Educational Aide	2	6- 9	18.09	17.50-18.52	9.22	7.70-10.00
Administrative Secretary	1	9	15.00	--	10.65	--
Court Reporter	2	18-24	3.69	3.56- 4.00	2.62	1.16- 3.06
Rural Banking	2	18-22	6.99	5.78- 8.13	3.98	3.41- 4.47
Clerk Typist	1	12	4.36	--	2.14	--

TABLE 38 (CON'T)

	Number of Programs Offered	Length in Months	Completions per Licensed FTE Instructor	Range of Completions per Instructor*	Closely Related Placements per Licensed FTE Instructor	Range of Closely Related Placements per Instructor*
Technical						
Air Traffic Control	1	24	7.66	--	1.91	--
Chemical Lab Technician	2	9-18	8.33	7.78- 9.58	6.08	4.98- 6.38
Cable Television Technician	2	10-22	4.24	3.25- 5.00	3.48	2.37- 4.35
Electro-Mechanical Technician	4	11-24	8.77	5.83-11.43	6.93	3.91- 8.23
Environmental Technician	3	10-19	6.92	5.00- 9.64	5.19	4.55- 6.85
Industrial Energy Systems	3	22	5.64	3.33- 6.85	3.95	1.67- 4.86
Instrumentation Technician	2	18	6.59	5.71- 7.50	4.54	4.29- 4.73
Quality Control Technician	2	18-23	5.46	5.38- 5.49	3.61	--
Industrial Technician	2	14-18	5.62	4.89- 5.82	4.50	3.13- 4.77
Tool Engineering & Design	1	18	3.86	--	3.13	--
Food Lab Technician	2	20-23	3.69	0.81- 5.96	2.86	--
Electro-Medical Technician	2	1[illegible]-24	9.40	4.87-15.71	3.26	--
Avionics-AviationTechnician	1	20	4.77	--	4.25	--
Electronic Comm. Technician	[illegible]	18	5.81	--	4.83	--
Powder Metal Technician	1	4-22	7.14	--	4.79	--
Trade and Industrial						
Energy Codes & Conservation	1	9	4.44	--	N/A	--
Appliance Repair	4	9-18	7.32	4.32-13.81	3.95	1.94- 6.90
Used Car Renovator	1	9	7.14	--	2.00	--
Aircraft Mechanics	3	19-21	6.11	1.43- 9.08	3.61	1.03- 4.90
Lettering and Design	1	9	15.45	--	3.95	--
Commercial Photography	2	12-18	9.48	6.51-11.85	4.93	4.10- 5.21
Photographic Technician	2	18-22	6.24	4.00- 8.16	3.74	2.92- 3.83
Construction	4	9-18	5.99	5.26- 7.59	4.08	3.19- 4.28
Diesel & Truck Mechanics	4	12-24	6.16	1.92-13.21	3.70	1.06- 7.66
Bricklaying	2	10-11	10.90	9.58-11.48	6.97	6.90- 7.12
Painting and Decorating	2	9-11	10.50	9.66-11.31	7.88	7.34- 8.48
Heavy Equipment Operation	3	21-22	8.83	6.43- 9.59	4.39	1.63- 6.28
Mobile Home Repair	2	10-16	7.70	5.41-11.25	0.92	0.43- 1.58
Office Machine Service Person	3	9-20	6.07	4.36-15.83	4.49	3.18-10.29
Custodial & Bldg. Maintenance	3	6-10	6.64	4.58- 7.25	3.45	1.15- 4.26
Architectural Drafting	4	8-20	6.90	6.09- 7.94	5.31	4.69- 5.54
Technical Drafting	1	22	6.25	--	4.00	--
Construction Drafting	4	9-22	5.89	5.23- 6.76	4.51	4.09- 6.25
Electrical Lines Person	3	10-11	13.94	12.62-15.38	11.99	10.60-12.92
Electric Motor Winding & Repair	1	11	11.15	--	8.48	--
Telephone Comm. Technician	3	11	12.25	11.28-15.00	10.05	9.36-11.70
Audio-Visual Technician	3	10-23	5.67	2.73- 8.59	2.78	1.64- 3.78
Radio & Television Repair	4	11-18	9.10	6.54-12.78	5.83	3.27- 8.69
Printing Offset	1	10	16.20	--	8.59	--
Optical Technician	2	10	11.15	10.91-11.25	7.14	7.08- 7.31
Watchmaking	1	9	11.85	--	9.01	--
Production Machinist	4	9-21	12.72	6.78-19.44	8.65	5.29- 8.68
Sheet Metal	4	9-21	10.70	3.46-20.00	7.49	2.87-15.00
Patternmaker	1	21	3.85	--	3.19	--
Jewelry Repair	1	15	9.09	--	7.45	--
Barbering	1	12	4.31	--	4.01	--
Plastic Injection Molding	2	9-22	6.88	2.50- 8.33	3.69	3.44- 4.17
Law Enforcement	2	18	5.84	4.49- 9.83	4.03	3.86- 5.99
Baking	3	9-11	8.44	6.04-12.50	3.80	2.75- 4.95
Meat Cutting	2	11	11.42	10.71-13.23	7.76	7.29- 9.00
Waiter/Waitress	1	10	4.58	--	N/A	--
Kitchen Assistant	2	4	13.71	10.77-22.22	5.76	4.74- 9.11
Total Energy	1	9	11.50	--	4.37	--
Tailoring	2	11-15	5.68	4.23- 7.78	2.22	1.31- 3.66
Shoe Repair	1	12	6.15	--	3.08	--
Upholstery	2	18	6.04	4.23- 6.77	3.14	1.23- 3.86
Cabinet Making	4	15-18	9.20	8.46- 9.65	5.89	3.98- 6.83
Wood Finishing	1	11	10.00	--	5.70	--
Musical String Instrument Repair	1	10	13.20	--	5.94	--
Band Instrument Repair	1	9	13.71	--	9.19	--
Electronic Musical Instrument	1	18	7.50	--	4.80	--

Source: Data on completions and licensed instructors were obtained from SDE Program Budget Reports. Placement data were obtained from the Minnesota Vocational Follow-Up System.

*No range for placements per instructor or completions per instructor is listed if there was only one program of a particular type or if there were placement data for only one program. "N/A" indicates that none of the programs of this type had completion or placement data.

**At the school offering this program, only one student responded to the follow-up survey. That student did not have a closely related job.

TABLE 39

PROGRAMS WITH FEWER THAN FIVE COMPLETIONS PER FULL-TIME LICENSED INSTRUCTOR FISCAL YEARS 1980 AND 1981 (METHOD 1)

	Completions per Instructor					Total Number of Programs with Less than 5.0	Percentage of All Programs
	0-.99	1.00-1.99	2.00-2.99	3.00-3.99	4.00-4.99		
Agriculture	0	1	4	8	9	22	44%
Distributive Education	1	1	3	5	11	21	34
Health	0	0	1	2	2	5	6
Home Economics	0	0	0	2	1	3	14
Business and Office	0	0	2	4	9	15	9
Technical	1	0	3	5	6	15	21
Trade and Industrial	0	5	5	19	39	68	20
TOTALS	2	7	18	45	77	149	19%

Source: Program Evaluation Division analysis of data from SDE Program Budget Reports.

TABLE 40

PERCENTAGE OF PROGRAMS WITH FEWER THAN THREE CLOSELY RELATED PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR: FISCAL YEARS 1980 AND 1981 (METHOD 1)

	Number of Programs with Less than Three Closely Related Placements per Instructor	Number of Programs that Operated Both Years and had Placement Data	Percentage of Programs
Agriculture	16	44	36%
Distributive Education	19	56	34
Health	8	72	11
Home Economics	10	17	59
Business and Office	19	150	13
Technical	11	68	16
Trade and Industrial	63	324	19
AVTI System	146	731	20%

Source: Program Evaluation Division analysis of data from the Minnesota Vocational Follow-Up System and SDE Program Budget Reports.

TABLE 41

PERCENTAGE OF PROGRAMS 15 TO 24 MONTHS IN LENGTH WITH LESS THAN FOUR COMPLETIONS OR THREE CLOSELY RELATED PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR: FISCAL YEARS 1980 AND 1981 (METHOD 1)

Occupational Area	Number of Programs Offered*	Percentage of Programs with Fewer Than 4 Completions per Licensed FTE Instructor	Percentage of Programs with Fewer Than 3 Closely Related Placements per Licensed FTE Instructor	Percentage of Programs Under Both Standards	Percentage of Programs Under One or Both Standards
Agriculture	28	32%	43%	25%	50%
Distributive Education	32	19	37	19	37
Health	11	9	27	9	27
Home Economics	3	67	100	67	100
Business and Office	36	11	33	5	39
Technical	57	14	17	12	19
Trade and Industrial	182	13	25	12	26
TOTAL	349	15%	28%	13%	30%

Source: Data on completions and licensed instructors were obtained from SDE Program Budget Reports. Placement data were obtained from the Minnesota Vocational Follow-Up System for fiscal years 1977, 1978, and 1979.

*This number includes only programs that operated in both fiscal years 1980 and 1981 and had placement data.

TABLE 42

PERCENTAGE OF PROGRAMS 6 TO 14 MONTHS IN LENGTH WITH LESS THAN EIGHT COMPLETIONS OR FIVE CLOSELY RELATED PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR: FISCAL YEARS 1980 AND 1981 (METHOD 1)

Occupational Area	Number of Programs Offered*	Percentage of Programs with Fewer Than 8 Completions per Licensed FTE Instructor**	Percentage of Programs with Fewer Than 5 Closely Related Placements per Licensed FTE Instructor	Percentage of Programs Under Both Standards	Percentage of Programs Under One or Both Standards
Agriculture	16	31%	62%	31%	62%
Distributive Education	23	30	61	30	61
Health**	47	15	15	13	17
Home Economics	14	36	64	36	64
Business and Office	109	25	40	21	44
Technical	11	27	45	27	45
Trade and Industrial	134	30	44	27	47
TOTAL	354	26%	42%	24%	44%

Source: Data on completions and licensed instructors were obtained from SDE Program Budget Reports. Placement data were obtained from the Minnesota Vocational Follow-Up System for fiscal years 1977, 1978, and 1979.

*This number includes only programs that operated in both fiscal years 1980 and 1981 and had placement data.

**For health programs, cutoffs of 6 completions and 4 closely related placements per full-time instructor were used.

TABLE 43

PERCENTAGE OF PROGRAMS 6 TO 24 MONTHS IN LENGTH WITH LOW COMPLETIONS OR CLOSELY RELATED PLACEMENTS PER FULL-TIME LICENSED INSTRUCTOR RATIOS: FISCAL YEARS 1980 AND 1981 (METHOD 1)

Occupational Area	Number of Programs Offered*	Percentage of Programs with Low Completions per Licensed FTE Instructor Ratios	Percentage of Programs with Low Closely Related Placements per Licensed FTE Instructor Ratios	Percentage of Programs Low Under Both Standards	Percentage of Programs Low Under One or Both Standards
Agriculture	44	32%	50%	27%	55%
Distributive Education	55	24	47	24	47
Health	58	14	17	12	19
Home Economics	17	41	71	41	71
Business and Office	145	21	39	17	43
Technical	68	16	22	15	23
Trade and Industrial	316	20	33	18	35
TOTAL	703	21%	35%	19%	37%

Source: Data on completions and licensed instructors were obtained from SDE Program Budget Reports. Placement data were obtained from the Minnesota Vocational Follow-Up System for fiscal years 1977, 1978, and 1979.

*This number includes only programs that operated in both fiscal years 1980 and 1981 and had placement data.

For these reasons, the two composite measures involving related placements might be considered too narrow by some. However, it should be pointed out that these measures do indicate the occupations where the AVTIs are doing a better job of matching students to jobs. Although the graduates with broadly related or unrelated jobs have probably received some benefits from their training, they would be better served if they were trained for jobs that they are more likely to get. It makes little sense to train many people for occupations in which the job opportunities are extremely limited. The Department and the AVTIs must be careful not to justify the continuation of programs that have low closely related placement rates, when the AVTI system offers other vocational programs that could do a better job of serving these students. This is particularly important since many of the programs with good placement rates are operating at lower than optimal student/teacher ratios and can accommodate more students.

B. STUDENT AND EMPLOYER SATISFACTION

In addition to data on program completions and related placements, the Minnesota Vocational Follow-Up System gathers information on student satisfaction with AVTI programs and instructors and employer satisfaction with AVTI graduates. Generally, AVTI programs, instructors, and graduates receive good ratings. For example, 72 percent of graduates responding to the follow-up survey say one year after graduation that they would choose the same program again. Fifty-eight percent of those with related jobs say they are satisfied with their salaries, while 19 percent are not sure and 23 percent are dissatisfied. Forty-seven percent are satisfied with their jobs' advancement potential, while 29 percent are not sure and 24 percent are dissatisfied. Higher percentages of those with related jobs are satisfied with other aspects of their jobs one year after graduation.

Students also indicate a general satisfaction with AVTI instructors. Eighty-six percent of graduates responding felt that most AVTI instructors were very knowledgeable. Eighty-three percent thought most instructors were up-to-date. Seventy-four percent thought most instructors taught very well. Sixty-eight percent said that most instructors were very interested in their progress.

Employers of AVTI graduates with related jobs generally gave the graduates good ratings. Fifty percent of the employers responding rated the AVTI graduates in the top one-fourth of their work groups. Thirty-eight percent rated AVTI graduates in the second one-fourth. Only twelve percent of the graduates with related jobs were rated in the bottom half of their work groups.[2]

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[2] The data presented are averages for students graduating in fiscal years 1980 and 1981 and their employers.

While these ratings were generally high, three important points should be made. First, although overall ratings were high, this does not mean that ratings of individual programs were uniformly high. In reviewing placement rates, we found an analogous situation. Most graduates had jobs that were either closely or broadly related to their training. However, a significant number of programs had related placement rates of 50 percent or less.

Second, some of these data are limited in their usefulness. In particular, data on employer satisfaction have a number of limitations. The data only tell us how employers rate students with related jobs. Placement data are more useful because they tell us what percentage of graduates have related jobs in the first place. When the percentage with related jobs is very low in a particular program, data on employer satisfaction may add little of importance. If employers are dissatisfied with the few graduates getting jobs, however, this might indicate that the placement problem may be related to a failure to adequately train students for employment.

It is also known that employers are generally reluctant to turn in negative reports on employees. Employers may feel they have nothing to gain and something to lose if they respond negatively to the survey. Students dissatisfied with their work may also be less likely to identify their employers for follow-up. As a result, there is reason to suspect that employers who respond to the survey are those who are likely to report favorably on AVTI graduates they employ.[3] For fiscal years 1980 and 1981, data on employer satisfaction are not available for approximately 40 percent of graduates with related jobs.

Third, data on student satisfaction with programs may not be a valid indicator of program performance. In particular, we question whether the percentage of graduates who say they would take the course again is useful. This survey question may only indicate whether the students enjoyed the course, not whether they received any tangible employment benefits as a result. A few examples serve to illustrate this point. We examined several programs that had closely related placement rates of 50 percent or less in fiscal years 1977 through 1979. We found that fiscal year 1980 graduates of these programs responded to the student satisfaction questions in the following ways:

- Ninety-three percent of the graduates of an apparel arts program said they would take the program again. Only 5 of the 14 graduates responding to the survey had jobs closely or broadly related to their training. Three of the five graduates with related jobs were dissatisfied with their salaries.

- Sixty-one percent of the graduates of a fashion merchandising program said they would take the program again.

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[3] The Vocational Education Study: The Final Report, The National Institute of Education, U.S. Department of Education, September 1981, p. IV-14 and IV-15.

However, 11 of the 18 graduates who responded did not have a closely or broadly related job. Four of the seven with related jobs were dissatisfied with their present salaries.

- All five responding graduates of a legal secretary program indicated they would take the program again. Only one of the graduates had a related job and this graduate was dissatisfied with the current salary.

- Twenty-five of 29 graduates of a child care assistant program said they would take the program again. Only eight had a related job, while nine had unrelated jobs, nine were not employed, two said they were employed but did not give any job information, and one did not respond to the employment question. Three-fourths of those with related jobs were dissatisfied with their salaries.

- Eighty percent of the graduates of a horse care and stables operations program said they would repeat the course. However, only 2 of the 10 graduates had related jobs.

- Nine of the 13 responding graduates of a farm management program said they would repeat the program. Only 6 of the 13 had jobs in agriculture and none of those graduates were satisfied with their salaries.

- Seventy percent of the graduates would repeat a mobile home/manufactured housing construction and maintenance program. However, only 3 of the 10 graduates responding had a related job.

The data on student satisfaction with job characteristics such as salary and with instructors may be of some use in evaluating programs. For example, if a high dropout rate occurs in a program for which graduates rate the instructor low, this might indicate that the quality of instruction needs to be improved.

While these data have some uses, it is important that they not be used to obscure fundamental problems that a program has. For example, a program with low related placement rates should not be continued simply because the small number of graduates with related jobs and their employers are satisfied. Actions should be taken to improve the related placement rates. Failing that, termination of the program should be seriously considered.

C. OTHER CONSIDERATIONS

In evaluating programs, there are a number of other factors that should be considered. Two, in particular, are worth mentioning. One is the percentage of special needs students served by a program. The other is the percentage of nonresidents of Minnesota served. These considerations are discussed below.

1. SPECIAL NEEDS STUDENTS

The AVTIs provide various types of services and programs for handicapped individuals, academically disadvantaged students, economically disadvantaged students, and students with limited English proficiency. The programs serving these students are referred to as special needs programs. These programs include remedial mathematics, remedial reading, English as a second language, testing assessment, job seeking and keeping skills, interpreter for the deaf, counseling and referral, and other programs. Some of this special needs instruction takes place prior to a student's entry into a regular instructional program. This provides students with the skills to successfully take a regular vocational program. Other special needs instruction is provided to students at the same time they are enrolled in regular vocational programs.

Special needs students in regular vocational programs comprise about 18 percent of the students in those programs.[4] About 16 percent are academically or economically disadvantaged, one percent are handicapped, and one percent have limited English proficiency. The largest group is students who are academically disadvantaged. This group includes individuals who lack reading and writing skills, lack mathematical skills, or perform below grade level.

In evaluating the performance of regular vocational programs, attention must be paid to the percentage of special needs students served by the program. There are several regular vocational programs that almost exclusively serve mentally retarded and other handicapped students. While we should have expectations that these programs help students obtain meaningful employment, we cannot apply the same standards to these programs as to other vocational programs.

In addition, there are other programs with a relatively high percentage of academically or otherwise disadvantaged students. On the one hand, care must be exercised so that opportunities for these students are preserved. On the other hand, we must ensure that we are not training these or other students for jobs that are not in sufficient demand. In other words, a low placement rate may indicate a lack of opportunities in a particular occupation. It makes no sense to train academically disadvantaged students, or others for that matter, for jobs they are not likely to get because of low occupational demand.

We attempted to determine if vocational programs with low student/teacher ratios or low related placement rates were primarily programs with a high percentage of special needs students. Table 44 shows that programs with student/teacher ratios under ten in fiscal year 1981 had a slightly lower percentage of special needs students than the average program. Programs with closely related placement

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[4] This and other estimates are based on the State Department of Education's Special Needs Analytical Profile (SNAP reports) for fiscal year 1981. Data on Suburban Hennepin AVTI were not included in the reports for that year.

TABLE 44

PERCENTAGE OF SPECIAL NEEDS STUDENTS IN PROGRAMS WITH LOW STUDENT/TEACHER RATIOS OR LOW PLACEMENT RATES: FISCAL YEAR 1981

Percentage of Special Needs Students	All Programs*	Programs with Student/Teacher Ratios Under Ten*	Programs with Closely Related Placement Rates of 50 Percent or Less*
0 to 17%	60%	67%	51%
18 to 25%	11	14	15
0 to 25%	71%	81%	66%
26 to 50%	20	13	20
51 to 100%	9	6	14
TOTALS	100%	100%	100%

Source: SDE SNAP reports for fiscal year 1981.

*Suburban Hennepin AVTI programs are not included.

rates of 50 percent or less had a slightly higher percentage of special needs students. These data indicate that there is a need to carefully consider this factor in evaluating programs, but that most programs with low placement or low student/teacher ratios also have a lower than average percentage of special needs students.

According to Division of Vocational-Technical Education managers, there are other AVTI students who need remedial instruction in reading, writing and mathematics but do not receive it from existing special needs programs. It is difficult to verify the extent to which this occurs; however, it is clear that the AVTI system does serve a student clientele different from that of other post-secondary systems in Minnesota. The AVTI student population has lower combined verbal and math aptitude test scores than the students enrolled at schools in the other three systems. The AVTIs also serve more students of a low socioeconomic status.

If the Department is correct, there may be reason to extend remedial instruction programs to cover more students than currently are being served. The increased coverage might help to reduce dropout rates. In evaluating programs, however, one should be careful not to attribute every dropout or placement problem to the nature of the student clientele. The data presented in this report indicate the poor performance of many vocational programs is due to other factors.

2. NONRESIDENTS

In fiscal year 1980, about 11 percent of enrollees at Minnesota AVTIs were nonresidents. The percentage was higher at some schools, particularly those near Minnesota's borders. The percentage of nonresident enrollees ranged from 3.5 percent to 54.9 percent. At six AVTIs, the percentage of nonresidents was 20 percent or more in fiscal year 1980.

The question of whether the State Department of Education should consider the percentage of nonresidents in a program when evaluating the program is an interesting one. The answer has a great deal to do with the level of nonresident tuition and the reciprocity agreements our state has with other states. If nonresident tuition covers the marginal costs of vocational education, then there is little need to be concerned. Nonresident students or their states would then be paying for the additional costs imposed on the AVTIs. Where reciprocity agreements exist, the issue is complicated. One needs to consider the number of Minnesota residents attending post-secondary schools outside of Minnesota under reciprocity agreements. In addition, the reciprocity agreement with Wisconsin also covers income tax payments of nonresidents working in the other state.

It was beyond the scope of this study to evaluate existing reciprocity agreements and the level of nonresident tuition. However, even under existing conditions, there may be a very limited role for the consideration of the percentage of nonresidents when evaluating vocational programs. For example, there are a few unique or highly specialized programs offered by AVTIs that have relatively low numbers of either completions or closely related placements, many of whom are nonresidents. The AVTIs offering these programs do not necessarily have a high percentage of nonresidents at their schools. These particular programs, however, attract a high percentage of nonresidents.

In these cases, few students are placed in closely related jobs and even fewer are Minnesota residents. Since the number of closely related placements is low, the need for the program should be seriously questioned anyway. The fact that a high percentage of those with related jobs are nonresidents is yet another factor that suggests that the program be discontinued. In other words, when specialized programs are being considered for termination on the basis of their performance, a high percentage of nonresidents being served could be the factor that decides the issue.

VIII. RECOMMENDATIONS

The findings in this report indicate that there has been a serious lack of program accountability within the AVTI system. While the system serves an extremely important function and has many fine programs, the message should be clear. There are significant areas in which resources can be used more efficiently and effectively.

We recommend that the State Department of Education, the State Board for Vocational Education, and the AVTIs reexamine the programs currently being offered in light of these findings and take strong actions to improve the system. We make the following specific recommendations:

- The State Board for Vocational Education should set higher minimum student/teacher ratios for non-health programs.

- The State Department of Education should identify those programs or program sections with student/teacher ratios below these standards and recommend appropriate action to the State Board. Attention should be paid to whether similar programs are offered by other nearby AVTIs or community colleges. Unnecessary program duplication should be eliminated.

- The Department and the State Board should take the necessary steps to achieve a systemwide student/teacher ratio of at least 17 in non-health programs and 12 in health programs, including related instructors.

- The State Board for Vocational Education should establish a clear and meaningful policy regarding the related placement rates AVTI programs are expected to achieve. The State Department of Education should develop a reasonable definition of related placement.

- The Department, in cooperation with the AVTIs, should closely examine those programs with low placement or high dropout rates and determine the reasons for poor performance. Existing data on employer satisfaction with graduates and student satisfaction with programs may help to clarify the reasons. Where appropriate, programs should be modified or terminated.

- Special attention should be paid to specialized training programs with low closely related placement rates. For example, by reducing the number of legal secretary and medical secretary programs, efficiency can be improved without materially affecting the number of students placed in clerical occupations.

- The Department should supplement its review of programs by examining certain composite measures of program efficiency and effectiveness. For example, the cost per completion or completions per full-time instructor could be used to identify those programs that are inefficient. Cost per related placement or related placements per full-time instructor are useful composite measures of a program's efficiency and effectiveness.

- The Department should also examine those programs, such as fashion merchandising, whose graduates earn wages similar to high school graduates one year after graduation. A limited 3 year follow-up of these AVTI graduates should be conducted to determine if graduates of these programs fare any better in the long run than high school graduates without the training.

Programs with a high percentage of handicapped or other disadvantaged students classified as special needs students should not be expected to meet the same standards as other programs. Interestingly, our research indicates that the performance of programs with a greater than average percentage of special needs students is not significantly different from those with few special needs students. Some schools with a higher than average percentage of special needs students also have better performance records than other schools.

It should be emphasized that this process of program review and improvement should be a cooperative effort involving the AVTIs, the Division of Vocational-Technical Education in the State Department of Education, and the State Board for Vocational Education. The State Board and the Division must set goals and objectives for the system and provide the overall direction and leadership needed to achieve them. The Division also has the data necessary to conduct a systematic review of programs. AVTIs are more familiar with the unique aspects of the programs they offer, the students they educate, and the occupational demands of local employers.

The problem of unnecessary program duplication, in particular, will require not only the cooperation of the parties within the AVTI system, but also other post-secondary systems offering vocational programs. In light of their statutory responsibility to review significant post-secondary program changes and to recommend discontinuation of unnecessary program duplication, we recommend that the Higher Education Coordinating Board and its staff review the results of this report and ensure that a coordinated approach to this problem is taken by the systems involved.

The Vocational-Technical Education Division of the State Department of Education and State Board for Vocational Education must assume most of the responsibility for the lack of program accountability in the AVTI system. We recognize that the AVTIs also share in that responsibility. However, we believe that adequate direction and assistance from top management are requirements for success in any organization.

It should be recognized that the State Department of Education and State Board, with new division management, has begun to emphasize the need for greater program accountability within the last two years. The Division has begun to enforce the existing rule requiring programs to maintain a student/teacher ratio of ten. Because of budget cuts, seven of the programs not meeting the requirement in fiscal year 1982 were voluntarily eliminated by AVTIs effective in fiscal year 1983. The Division is recommending to the Board that six others also be terminated.

AVTIs in southwestern Minnesota and the Division have begun to consider cooperative efforts that might reduce administrative and program costs in that area of the state. The State Department of Education is also preparing legislation that will facilitate cooperation among locally controlled AVTI districts.

In response to legislative requests to all four post-secondary systems, the State Board has prepared a report responding to declining enrollments and resources. The report briefly outlines the planning approach that the Division proposes to use in reviewing both instructional programs and support services. For instructional programs, the Division intends to review each program's performance in three key areas: (1) responsiveness to students, (2) responsiveness to the employment market, and (3) efficiency. More specifically, the following indicators of results in these areas will be used to evaluate each program:

- Student satisfaction with the program;
- Special needs students served by the program;
- Number of similar programs offered in that geographic area;
- Percentage or number of students completing the program;
- Employer satisfaction with the program;
- Related placement rates for the program's graduates;
- Utilization of instructional staff in the program (for example, student/teacher ratio);
- The program's instructional cost per ADM; and
- The instructional cost per program completion.

According to the Division, these criteria will begin to be used to review programs during the budgeting process for fiscal year 1984.

These developments indicate that the Division, the State Board, and the AVTIs are headed in the right direction. With declining state resources and projected enrollment declines, it will be necessary to maximize the return that students, employers, and taxpayers receive from post-secondary vocational education. The best way to address the problem of declining resources is to make adjustments that save money but have the least impact on the services provided and the benefits received.

While some steps have been taken toward achieving greater program accountability, it is clear that much more work is needed. The comprehensive review of programs that we recommend will require the Division to place a great deal more emphasis on related placement rates and completion rates than has been done in the past. It will also require a greater ongoing effort to evaluate and improve programs.

The involvement of the Legislature and the Governor's Office is also needed to ensure that greater program accountability is achieved. We recommend that the appropriate legislative committees require the State Department of Education to report back on the progress made over the next year. In addition, we suggest that the Legislature and the Governor budget funds for the AVTI system consistent with the goal of achieving an average student/teacher ratio of at least 17 in non-health programs and 12 in health programs. Appropriation levels will determine how far the AVTI system will go toward achieving these and other objectives outlined in this report. It is equally important, however, that resources for vocational education be carefully allocated. Education is vital to maintaining and attracting jobs. The AVTIs must be able to respond to the needs of employers for skilled workers and be able to adjust to changing economic conditions.

It should be pointed out that due to revenue cuts, the AVTI system is running a deficit during fiscal year 1983. According to the Division of Vocational-Technical Education, roughly half of the schools are running a deficit and the other half are close to breaking even for the year. The Division estimates that the systemwide deficit is roughly $3 million to $5 million. It has been possible to fund the current year deficits because most schools have maintained sufficient cash reserves. Next year, however, some schools will not have sufficient reserves to continue operating at current levels. If revenues do not increase sufficiently to restore these funds and to meet inflationary increases, the system will need to make expenditure adjustments. Current year deficits and projected end of the year cash balances need to be considered in determining AVTI funding.

A number of more substantial structural changes in vocational education have been suggested by others. During the 1981 legislative session, the Higher Education Coordinating Board (HECB) recommended that the AVTI and community college systems be merged. The HECB proposal would have removed the operational control of AVTIs from local school districts. Alternatively, the AVTI system could be made a state system like Minnesota's other post-secondary systems. Such a change would also remove local control but not involve a merger.

Such proposals have not been the focus of this report. However, the results of this report are relevant to a discussion of alternative structures. The question of whether the existing organizational structure can and will respond to the need for greater program accountability is one of the important issues in such a discussion. The response of the AVTIs and the State Department of Education to this problem should be reviewed if a major structural change is considered. In addition, many other issues, such as the effect that removing local control might have on salary expenditures, would need to be considered.

The Legislature and the State Board may also wish to review the instructional aid funding formula. The formula tends to work well as long as programs are operated efficiently and effectively. However, since the formula allocates funds based on previous staffing levels, it can result in some inequities when this is not the case. For example, programs operating at unnecessarily low student/teacher ratios receive funding based on those inefficient staffing levels. If the AVTI improves the program's efficiency or the State Board terminates the program, the AVTI would continue to receive funding for the program based on the inefficient staffing levels for two years unless the AVTI's total enrollment is significantly affected.

Such a result is clearly inequitable for schools already operating efficient programs. The State Board can, however, make some adjustments in the funds it allocates to AVTIs that would at least partially offset these inequities. Funds for equipment and supplies need not be allocated for terminated programs. Also, in allocating support service aids, the Board can take into account the level of cash reserves for each school. To the extent that inequities might result in higher projected cash reserves, these aids could be adjusted. In the past year, the Board has also used different percentages of tuition revenue as an offset in allocating support services aid. This procedure might also be used as a means of correcting these inequities.

In summary, there are ways in which some of the inequities can be addressed by the Board. They can, however, result in an unnecessarily complex way of budgeting for programs and support services. It may take more experience with the formula to determine whether inequities can be adequately controlled.

STUDIES OF THE PROGRAM EVALUATION DIVISION

Final reports and staff papers from the following studies can be obtained from the Program Evaluation Division, 122 Veterans Service Building, Saint Paul, Minnesota 55155, 612/296-8315.

1977

1. Regulation and Control of Human Service Facilities
2. Minnesota Housing Finance Agency
3. Federal Aids Coordination

1978

4. Unemployment Compensation
5. State Board of Investment: Investment Performance
6. Department of Revenue: Assessment/Sales Ratio Studies
7. Department of Personnel

1979

8. State-sponsored Chemical Dependency Programs
9. Minnesota's Agricultural Commodities Promotion Councils
10. Liquor Control
11. Department of Public Service
12. Department of Economic Security, Preliminary Report
13. Nursing Home Rates
14. Department of Personnel, Follow-up Study

1980

15. Board of Electricity
16. Twin Cities Metropolitan Transit Commission
17. Information Services Bureau
18. Department of Economic Security
19. Statewide Bicycle Registration Program
20. State Arts Board: Individual Artists Grants Program

1981

21. Department of Human Rights
22. Hospital Regulation
23. Department of Public Welfare's Regulation of Residential Facilities for the Mentally Ill
24. State Designer Selection Board
25. Corporate Income Tax Processing
26. Computer Support for Tax Processing

27. State-sponsored Chemical Dependency Programs, Follow-up Study
28. Construction Cost Overrun at the Minnesota Correctional Facility - Oak Park Heights
29. Individual Income Tax Processing and Auditing
30. State Office Space Management and Leasing

1982

31. Procurement Set-Asides
32. State Timber Sales
33. Department of Education Information System
34. State Purchasing
35. Fire Safety in Residential Facilities for Disabled Persons
36. State Mineral Leasing

1983

37. Direct Property Tax Relief Programs
38. Post-Secondary Vocational Education at Minnesota's Area Vocational-Technical Institutes

In Progress

39. Community Residential Services for the Mentally Retarded
40. State Land Acquisition and Disposal